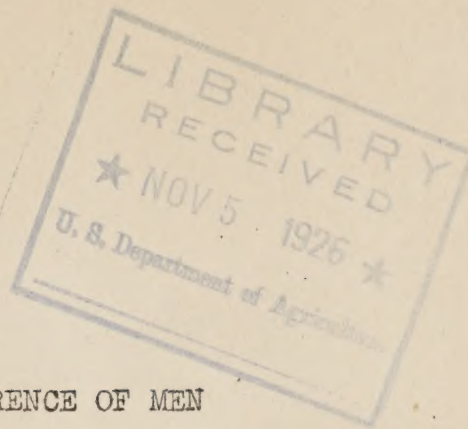


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27-29, 1926



CONFIDENTIAL REPORT OF CONFERENCE OF MEN
REPRESENTING U. S. DEPARTMENT OF AGRICULTURE,
STATE EXPERIMENT STATIONS AND THE INSTITUTE
OF AMERICAN MEAT PACKERS, ENGAGED IN SOFT
PORK INVESTIGATIONS HELD IN CHATTANOOGA, TENNESSEE
APRIL 27, 28 and 29, 1926.

Names of men in attendance

Stations

Alabama	Mr. Salmon
Arkansas	Mr. Martin
Georgia	Mr. Edwards
Iberia, La. U. S. D. A.....	Mr. Quesenberry
Indiana	Mr. Vestal
Mississippi	Mr. Templeton
North Carolina	Dr. Halverson
" "	Mr. Hostetler
Ohio.....	Mr. Robison
South Carolina.....	Mr. Durant
Tennessee	Dr. Jacob
Virginia	Mr. Nobles
U. S. Department of Agriculture.....	Mr. Russell
" " " "	Mr. Hankins
" " " "	Mr. Ellis
" " " "	Dr. Howe

Packers

Swift & Company	Mr. Ferguson
Institute of American Meat Packers....	Dr. Moulton

Mr. Russell: Because of the fact that some 5 or 6 of the men will not be here until about noon, we will not take up any of our regular reports until the afternoon session, but we have two matters we would like to present to you at this time.

We are mighty glad to report that at last the soft pork bulletin is in print. We have a few copies with us. It is needless for me to say that it has been a long while coming out. If you recall two years ago we started the manuscript and had hoped to have it out in a year. Instead of that it has been two years.

I want to call your attention particularly to the top of page one on which you see it stated "Prepared by O. G. Hankins and N. R. Ellis in consultation with those named on the preceding page as responsible for the work." You gentlemen will recall that it was decided there would be no names mentioned as authors. We tried in every way possible to keep these names off the bulletin. There is a rule in the Editorial Office which necessitates the authors' name on all bulletins. There must be somebody responsible for any bulletin that is printed. In order to file these bulletins, in a great many cases, the covers are torn off and filed; so in a case of this kind the authorship would be lost if the names were not put in. I will state again that we did what we could to comply with the request of the meeting so we finally agreed on the wording as stated. I think the rest of it is in substance, at least as was agreed upon by the meeting two years ago. I do not have anything particular to say about it except that I think you gentlemen are to be congratulated on the work that has been carried on up to this time. There is an immense amount of valuable information in this bulletin. It is needless for me to say that we never could have gotten the material together and accomplished the results that are shown here had it not been for the hearty good will and cooperation of everybody connected with the work. So I really feel that the men engaged in soft pork work are to be congratulated on the results as far as we are able to publish them.

After a lot of pros and cons we finally were able to get 200 copies free for each cooperating station. We asked for 1000 copies but they tried to get us to get along with 100 copies so finally it was agreed as it was originally promised, that 200 copies be sent free to each station. Orders have been given to the Printing Office to mail these to you. Some of the stations have ordered extra copies at 3 ¢ per copy.

We do not want to take up any of the experimental results before the rest of the men get here, which we hope will be immediately after lunch. Mr. Hankins and Mr. Ellis have prepared and have submitted to you at this time the manuscript for the second bulletin. This, as you know, has been authorized by the meeting. We want to say that we expected to have copies mailed to you so you could have time to study them before the meeting but it had to be mimeographed and the order for this work was held up for a time, making it too late to mail the copies to you.

I would like to have you gentlemen take this manuscript and go over it at your convenience and I think tomorrow afternoon we will set an hour to discuss it. We want you to be free to offer such suggestions or

criticisms as you may feel are necessary.

Mr. Russell:

Mr. Hankins have you anything to offer further?

Mr. Hankins: I have just a word regarding the manuscript. It is not complete. It is complete only up to the summary and we did not have time to prepare that. The experimental results are all there and the summary can be prepared later. In that connection we would like to have your suggestions as to just what form it should take.

Mr. Russell: We will now adjourn until after lunch.

Tuesday Afternoon

Mr. Russell: We will now start the afternoon program. Before we get to the work of reporting experiments I think possibly it would be well to explain a few matters of procedure that usually take place at these meetings, for the benefit of some of those who are with us for their first meeting. Looking around the hall we find that Dr. Halverson is here with Mr. Hostetler from North Carolina. Mr. Robison is here from Ohio. This is the first time the Ohio station has been represented in the work. Mr. Martin is here from Arkansas. This is the first time he has been with us. The Institute of American Meat Packers is represented by Dr. Moulton. The rest are all familiar faces including Mr. Ferguson from Swift & Company.

The work as a whole has progressed very satisfactorily during the past year. We are getting to the place where we are really able to go more rapidly than heretofore, due to the fact that certain facts have been established. We are able to feed our lots in larger numbers than heretofore. This, of course, permits the work to progress more rapidly. Soybeans has been one of the main topics of investigation during the past year, peanuts has come in for its share but our work in peanuts is now along the line of using smaller pigs, 40 to 60, and 75 to 85^{pound} pigs. The work with 85 pound pigs and over has been practically concluded so there will not be any reports on work with that size hogs.

We have really a very complex and probably serious problem in our soybean work and I think as reports are made and some real consideration is given we will find that we have possibly more of a variety problem than we have thought heretofore. Then with variety comes palatability and possibly that may be directly connected with color of the beans. If we have these various problems we certainly have a complex one and one that is going to require some serious thought and consideration and that too in connection with the various tests that are to be carried on during the coming year. I just mention this that you may have it on your mind and sort of revolve it around so when the time comes we will have some concrete suggestions to make.

It has been the plan of our meetings from the first year, and this is the sixth, to appoint a committee who will go over the work of the past year and also over the summary of the work for previous years and, if in their judgement there are any conclusions that have been reached, to report them to this general meeting for adoption or to be thrown out. We thought it would be rather difficult for the whole meeting to take these matters up so it has been our plan to appoint a committee and it is also the duty of this committee to outline the work at the various stations for the coming year. As most of you gentlemen know we do not duplicate work except in so far as we think it is best to do so and assignments are made of work to be done at the various stations with these various kinds of feed. We will follow that plan the coming year. I think it would be well to name the committee at this time so they may know they have a problem ahead of them and possibly instead of letting some things slip they will grasp them as they come up. It has been the custom heretofore for the chairman to appoint this committee. I do not like to do that and we would much prefer the meeting itself to name the committee. If there are any suggestions for names I would be glad to hear them. If there are no suggestions I will take the liberty to name the committee. In doing so you will see a number of familiar names and the reason is that they are familiar with the work. I am going to name as chairman of this committee Mr. Vestal from Indiana.

Stations	Department
Mr. Vestal, Chairman	Mr. Hankins
Mr. Templeton	Mr. Ellis
Mr. Hostetler	

We follow the plan of taking up the feeding of each particular line and finishing that before taking up the next. The first is the peanut work but before we start into reports of experimental feeding results of the past year I am going to ask Mr. Ellis to explain some work he has been doing along the line of checking refractive indexes with iodine numbers on various feeds.

Mr. Ellis:

In checking up the correlation of committee grades with fat constants (refractive index and iodine numbers) while preparing the manuscript for the second soft pork bulletin, it has been found necessary to revise ^{grade} limits of the refractive index for certain types of rations and combinations of rations. A rather detailed study has been made comparing grades to refractive index and iodine number and the two latter with each other. Certain of this data is presented now for two reasons (1) To enable use of the revised grade limits of the refractive index in the interpretation of results during this meeting, and (2) Since this material is intended for incorporation into the second bulletin, the review of it at the present time will give you an opportunity to consider it for your approval along with the manuscript which has already been handed to you.

The parallelism existing between refractive indexes and iodine numbers was noted early in the work and was the reason for discounting the latter test. However, as a result of certain cases of marked irregularity in the agreement of gradings with the refractive index grade limits used as

a general classification of samples from all types of feeding, additional iodine numbers were run to better establish wherein the irregularities occurred. The iodine numbers were determined on a sufficient number of samples of back fat so that averages for groups of hogs as a whole and by 25 pound gain intervals could be made which would be exactly comparable to the refractive index figures used in preparing the various graphs of Bulletin 1407 and the manuscript for the second bulletin. It was found that one unit change in refractive index (.0001) corresponded to a change in iodine number of slightly under 0.9 for the majority of cases. From this data the graph Figure 9 (handed out) was prepared. The dual scales of refractive index and iodine numbers are given at the left as abscissae. Weights of hogs represent ordinates. The curves in the right half are all for hardening periods and were set off from the main part of the figure for greater clearness in tracing the changes in firmness.

Examination of the figure shows a very close agreement of the two fat constants for most of the rations thus far reported, namely, corn plus supplement, soybeans, peanut, and peanut meal - cornmeal 2:1. Although not given in the figure, soybeans plus a 2 1/2 per cent ration of corn, peanut meal - cornmeal 5:1, and brewers' rice with supplements show a similar agreement. Although there are some wide differences between refractive indexes and iodine numbers in the case of soybeans followed by corn with supplement, the results as a whole show a satisfactory alignment. However, the feeding of peanuts followed by corn shows a decided tendency for the iodine numbers to decline at a slower rate than the refractive index. The two curves agree in the decided tendency for the rate of hardening to decrease as gain increases since the amount of hardening from weights of 300 to 400 pounds is rather small.

Rations containing rice bran and rice polish as basal feeds caused the formation of fat with a higher iodine number than refractive index. This condition also persisted throughout the hardening period on corn with supplements.

It is of course, not surprising to find that the iodine number does not follow the refractive index in all cases since there is no constant relationship in this respect between various plant oils such as the oils contained in those feeds which are known to materially influence the composition of lard. Aside from the value of knowing just what values have been obtained on samples of fat from hogs under a given feeding system, the important question is their correlation with the firmness of the adipose tissue as measured by the grading of the carcasses. It was evident in the discussion of the results shown in the figure that some modification of the grade limits must necessarily follow along with a statement concerning the relative merits of the two tests.

The results of a study of the correlation of the iodine number and refractive index are contained in the accompanying diagrammatic table in which the grade limits are shown according to the various feeding plans.

Examination of the table shows the condition relative to grade limits to be similar to that for agreement of refractive index and iodine numbers shown in the figure. The same limits for the former value as given on page

11 of Department Bulletin 1407 apply to the rations listed at the top of the column. In fact these rations furnished a high proportion of the samples upon which the original limits were based. The limits for the iodine number parallel those for the refractive index.

The remaining groups are largely composed of hogs from more recent experiments. All show a decided tendency toward lower grade limits. The medium grades appear to have become very narrow, which makes the marking off of grade limits still more difficult than usual due to the pronounced overlapping of chemical values in the various grades. In addition, there were relatively few oily or hard hogs to establish limits of these grades. Particular attention is directed to the division points between the two medium grades which mark off hogs which are regarded as having a satisfactory firmness from those which are unsatisfactorily soft.

In the group of hogs fed corn following peanuts which here includes the total range of initial weights thus far studied, values of 1.4599 and above usually indicate unsatisfactory softness. When these data are applied to the curve for the refractive index in the figure representing hogs with an initial weight of 85 to 114 pounds, it will be seen that satisfactorily hard hogs as an average are not obtained even at weights of 400 pounds. At weights over 300 pounds increasing numbers of hard and medium hard hogs are obtained but those with soft or medium soft grades usually offset the former.

The iodine numbers were found to be extremely variable and rather unreliable for use as standards of firmness. The reason for the peculiar condition relative to the grade limits for this kind of feed is probably associated with the fact that the peanut feeding period results in the deposition of large amounts of glycerides composed entirely of unsaturated acids. These probably remain unchanged during the feeding period on corn during which more saturated glycerides are formed. This not only affects the refractive index and iodine number to the extent of interrupting the parallelism observed in the first group given in the table, but so affects the firmness that the medium grades are narrowed and lowered.

In the case of rice polish and rice bran, the division point for the medium grade is between 1.4599 and 1.4600 for the refractive index and at about 67.5 for the iodine number. Since these are softening feeds, the majority of the hogs are soft.

The feeding of corn following rice polish or rice bran causes a further depression of grade limits for hogs with initial weights on the softening feed under 100 pounds. A refractive index of 1.4598 and above indicate unsatisfactory softness.

The last column applies to pigs slaughtered at weights under 120 pounds and applies to the refractive index only. Compared to the general limits given in the first column, the soft grade covers a wider range with the results that the medium soft grade corresponds to the medium hard of the general limits. The latter grade here extends down to 1.4595. Explanation of this condition seems to lie in the lack of fatness. Such hogs are usually described as flabby. The composition of the adipose tissue

has been found to vary with the fatness and weight of the animal. The protein and water content decrease with increase in fatness and weight. A smaller quantity of fat in the adipose tissue with consequent higher quantity of protein tissue or structural mass appears to result in a masking of the real firmness or softness of the fat. The relative thickness of the adipose tissue acts in a similar manner. Gradings on light-weight or thin pigs are thus not altogether comparable to those on more mature fat hogs even though the actual composition of the fat is the same. However, the grade limits as given cover the usual condition encountered.

Grade Limits of Refractive Index and Iodine Numbers.

Grades	: 1. Corn and supplements		: Peanuts followed by		: Rice Polish		: Rice polish or rice		: Pigs under 120 pounds	
	: 2. Peanuts		: corn and supplements.		: Rice Bran		: bran followed by corn		: slaughter weight.	
	: 3. Soybeans alone or with		:		:		: and supplements.		:	
	: 2% corn.		: R. I. is the better.		:		:		: All feeds	
	: 4. Soybeans followed by		: I. No. grade division		:		: Initial weight of		:	
	: corn.		: points ill defined.		:		: pigs under 100 lbs.		:	
	: 5. Peanut meal - cornmeal		:		:		:		:	
	: 6. Brewers' rice		:		:		:		:	
	: R. I.		: R. I.		: R. I.		: I. No.		: R. I.	
	: From about		: From about		: Very few hard hogs		: Very few hard hogs		:	
Hard	: 1.4580		: 50.2		:		:		:	
	: to		: to		:		: to		: to	
	: 1.4597		: 65.4		: 1.4596		: ? 65.4		: 1.4595	
	: 1.4598		: 65.5		: 1.4597		: ? 65.5		: 1.4596	
Medium Hard	: to		: to		: to		: to		: to	
	: 1.4601		: 68.8		: 1.4598		: ? 67.1		: 1.4599	
	: 1.4602		: 68.8		: 1.4599		: ? 67.2		: 1.4598	
	: to		: to		: to		: to		: to	
Medium Soft	: 1.4605		: 72.3		: 1.4600		: ? 69.7		: 1.4601	
	: 1.4606		: 72.4		: 1.4601		: ? 69.8		: 1.4602	
Soft	: to		: to		: to		: to		: to	
	: 1.4618		: 83.7		: ?		: ? 80.2		: 1.4620	
	: 1.4619		: 83.8		:		: ? 80.3		: (Very few oily hogs): (Seldom an oily hog)	
	: to		: to		:		: to		: to	
Oily	: 1.4640		: 102.4		:		: ...		: (few oily	
	: or over		: or over		:		:		: hogs)	

Mr. Ellis: Are there any questions?

Dr. Halverson: These are averages of approximately how many hogs?

Mr. Ellis: It varies. In the iodine number work for instance in the group representative of corn and supplements in the progressive hardening work, we had originally 270 hogs and I think we had iodine numbers on approximately 100. I ran only sufficient iodine numbers so I would have enough to get averages corresponding to the refractive indexes on original averages that had been used to plot our curves. Of course on the grade limits of the refractive index we include all hogs that have been handled in the work. Therefore, the refractive index work covers all hogs and data on iodine numbers covers probably $1/3$ to $1/2$ of the number actually handled in a particular feeding group, but care was exercised to get a sufficient number so I think the averages are pretty near what they would be for the total number of hogs we have had.

Mr. Russell:

All stations taking part in this cooperative work are represented but three. Mr. Grimes of Pennsylvania found it impossible to come. I had a wire from Mr. Nobles of Virginia saying he would be here tomorrow morning. The California station is not represented but we have a report for this year's work. Before the fiscal year is out Michigan will have their first carload of hogs at Beltsville for slaughter. They are not represented.

We will now get down to the results of experiments. We will take up the results of the peanut work on 40 pound pigs. That includes work at North Carolina, Virginia and our station at Beltsville. Mr. Hostetler will report the results of the work at his station in this line.

Mr. Hostetler: In this work we used 15 forty-pound pigs. Three were shipped as check pigs and the other 12 used in the experiment. They were fed peanuts 8 weeks followed by corn, tankage and mineral. The 3 check pigs were slaughtered at an average slaughter weight of 39 pounds. All 3 were graded soft by the committee and the average refractive index for the 3 was 1.4606. Three more pigs were killed after 4 weeks hardening, the average live weight at slaughter being 142 pounds. These also were all graded as soft but the average refractive index was 1.4610. After 8 weeks hardening 3 more pigs were killed, the average live weight at slaughter being 171 pounds. All 3 were graded Medium Soft and the average refractive index was 1.4601.

The other killings from this experiment are yet to be made.

Following are the feeding results from the peanut-feeding period of this experiment:

Lot Number	E
No. hogs in lot	12
Rations fed	Peanuts and mineral self-fed, free choice
Initial wt. per lot	479
Ave. initial weight	39.9
Final wt. per lot	1063
Ave. final wt.....	88.6
Total gain per lot	584
Average gain per pig	48.7
Average daily gain per pig....	.87
Feed consumed	
Peanuts	2076
Mineral	174
Cost of feed consumed ..	: \$64.89
Feed consumed per 100 lbs. gain.	
Peanuts @ .03¢ per lb.	: 355 lbs.
Mineral @ .015 " "	: 30 "
Feed cost per 100 lbs. gain	\$11.11
Days on feed	: 56

Mr. Russell: Are there any questions?

The next on this work is Virginia and we will wait for the report until Mr. Nobles arrives. Mr. Hankins will take up the work we have done along this line at Beltsville.

Mr. Hankins:

We have two experiments to report here. Due to certain unsatisfactory features about one of them we decided not to photostat the record and sent it to you. We have since changed our mind and attach more importance to the results than we did. We had an outbreak of cholera at Beltsville last spring and it very badly interrupted our experiments and this was one of them. We fed these 40-pound pigs 8 weeks on peanuts in dry lot and it was after the hardening period on corn and tankage had begun that the sickness developed, so the feeding results through the softening period, we feel, are all right. There were 25 pigs in this test. The average initial weight was 39.3 pounds, average final weight at the end of the peanut feeding period was 58.8 and the average daily gain was .347 of a pound, through the 8 weeks feeding period. The total feed consumed per 100 pounds gain including peanuts and minerals was 520.6 lbs. At the close of the 8 weeks peanut feeding period, in view of the low rate of gain we had obtained we decided to carry these pigs on peanuts another 4 weeks, dividing them into 2 lots, feeding tankage in one lot and feeding the other lot as before. We divided the 25 pigs into 2 lots of 13 and 12 pigs. Where we fed tankage we got an average daily gain of 1.03 pounds during the 4 week period and where we continued on peanuts and minerals without tankage we got .60 a pound. There was also a very important difference in the feed required per 100 pounds gain. Where tankage was fed during the four week period it was 248 pounds, in the other case 457 pounds. I will say nothing about the feeding results during the hardening period. The killings made from the lot where tankage was fed during the third four-week period of the peanut-feeding part of the experiment were as follows: After 12-weeks peanut feeding, two hogs, both oily. Again after 33 days on corn with tankage, two hogs, also both oily. The refractive index averages in these two killings fell from 1.4626 to 1.4617 in 33 days feeding. In the next killing after 12 weeks on hardening feed only one was killed and it was hard. The refractive index was 1.4591. Then again after 171 days hardening we got one hard and one medium soft in the two killed. The gains after 33 days hardening feed were 55 pounds on peanuts and 33 pounds on hardening feed. Then 50 pounds on peanuts followed by 160 on hardening feed and 24 pounds followed by 191 on hardening feed. In the other lot fed peanuts and minerals without tankage, at the end of the 12 week peanut feeding we got 2 oily hogs with an average refractive index of 1.4626, the same as in the other lot. After 33 days of hardening we got 1.4612. That is five points lower than the corresponding killing from the other lot. There is some difference in the amount of gain made on peanuts, in the first lot more gain being made. After 12 weeks hardening we got a medium hard and a medium soft, with an average refractive index of 1.4602. The final killing from the second lot was after 16 weeks on hardening feed and the refractive indexes were 1.4599 and 1.4597 on the two pigs, both of them being graded as soft.

We have another experiment along this same line now in progress at Beltsville, which we hope will go on to conclusion without any interruption. In this experiment one lot was self-fed unshelled peanuts in self-feeders with access to mineral mixture. The other lot in addition to unshelled peanuts received tankage and mineral mixture free choice. There were 20 pigs in each lot and the total gain in the 56 day period in the tankage lot was 798 pounds, while in the no-tankage lot it was 343 pounds.

The hardening period of this experiment is still in progress, the pigs at this time having been on a hardening ration of shelled corn, tankage and minerals self fed, free choice, for 70 days. Two killings from each lot have been made. The first was made after 28 days on hardening feed and the second after 56 days. In lot 1 which received no tankage with peanuts the 3 pigs slaughtered after 4 weeks hardening had an average slaughter weight of 95 pounds. All were soft with an average refractive index of 1.4615. These pigs made about 1 1/2 times as much gain on hardening feed as was made during the peanut feeding period. The 3 pigs killed after 8 weeks hardening weighed 138 pounds as an average at the time of slaughter. These also were all soft but the average refractive index fell from 1.4615 to 1.4603. In this case approximately 3 1/2 times as much gain had been made on the hardening ration as made previously on peanuts.

lot

From the other 4 pigs were killed after 4 weeks hardening. The average live weight at slaughter was 112 pounds and all 4 were classed as soft, with an average refractive index of 1.4610. Approximately equal gains were made as an average on the softening and hardening rations. Four more pigs were killed after 8 weeks hardening, the slaughter weight being 156 pounds and the committee gradings as follow: 2 Medium Soft, 1 Soft, 1 Oily. The average refractive index for the group was 1.4604. Practically twice as much gain was made on hardening feed, as an average, as made previously on the softening ration.

Mr. Hankins: Are there any questions?

This is a chart which summarizes the results we have obtained up to date from this line of work. I want to say that, although in some cases we have fed tankage with peanuts, for the purpose of our studies on firmness we have grouped these pigs which received tankage along with those which did not. We are assuming that the only influence the tankage had was on gain. In other words, if the gain should be equal in two cases, with tankage and without, we would assume, other things being equal, that the two animals were comparable. We have 38 hogs grouped in this chart, starting at 40 pounds initial weight on the curve for corn with non-softening supplements. Mr. Ellis explained a moment ago that we have at least tentatively decided it is necessary to designate a new dividing line between "hard" and "soft" for hogs fed in this way.

Mr. Russell: The next group we have is pigs ranging in weight from 50 to 85 pounds starting weights. For the benefit of those who are not familiar with the work I will just state briefly that our first attempt at work with peanuts was using 100 pound pigs. It occurred to us that

we might be able to get some results by starting pigs at smaller weights and younger age. That is the reason for these two divisions being made, hoping that something might be gotten to determine and establish what actually will happen in the feeding of this weight pigs. If necessary the farmer in the peanut growing country could change his farrowing dates to meet conditions. The first experiment I have on the list is from the Georgia Station and I will just state that this work is still in progress but we will have a report as far as it has gone. We will now hear from Mr. Edwards.

Mr. Edwards:

I have a very brief summary here not reported heretofore. This includes two lots that were fed last year and not reported.

The two lots last year contained 30 pigs. We started out with a killing of three check pigs and three more pigs after 8 weeks on peanuts. They were all fed together on peanuts the first 8 weeks. After that the pigs were divided and half were fed on corn and supplements and the other half on brewers' rice and supplements. We made four shipments during the hardening period. The first shipment was made after 8 weeks on hardening feeds and the other shipments were made at 4 week intervals. The following table gives a summary of the results.

Summary of Results from 1924 -- 25 Soft Pork

Experiments at Georgia Experiment Station

Description of Pigs:	Aver. Daily Gain during Experiment	Aver. Committee Grading	Aver. Live wt. at Slaughter	Refractive Index		Cold Dressing Percent	Ratio of Gains on Softening, and Hardening Feeds:
				Pack. Fat	Leaf Fat		
Check Pigs	--	Soft	63	1.4609	1.4597	68.62	--
Peanut Softened, 8 weeks	.64	Soft-Oily	77	1.4623	1.4624	72.61	--
Corn Hardened, 8 weeks	1.42	Soft	197	1.4602	1.4602	79.39	1 : 2.6
Corn Hardened, 12 weeks	1.48	Med. Soft	247	1.4599	1.4597	84.64	3.1
Corn Hardened, 16 weeks	1.44	Med. Soft	391	1.4595	1.4593	84.54	4.2
Corn Hardened, 20 weeks	1.40	Med. Hard	313	1.4593	1.4591	85.55	5.5
Brewer's Rice Hardened, 8 weeks	1.15	Med. Soft	175	1.4598	1.4598	81.38	2.3
Brewer's Rice Hardened, 12 weeks	1.79	Med. Hard	297	1.4598	1.4591	84.85	3.6
Brewer's Rice Hardened, 16 weeks	1.46	Med. Soft	294	1.4595	1.4591	83.58	4.2
Brewer's Rice Hardened, 20 weeks	1.43	Med. Hard	325	1.4588	1.4589	85.96	7.4

GEORGIA EXPERIMENT STATION

SOFT PORK EXPERIMENTS FOR 1925-26

One lot of 17 head of pigs was fed on peanuts in this year's work to study soft pork. These pigs were to weigh from 50 to 84 pounds each at the start of the peanut feeding and were to be self-fed free-choice on peanuts in the shell and mineral mixture for a period of eight weeks. This peanut feeding period was to be followed by feeding until slaughter-time on shelled corn, digester tankage and mineral mixture, all self-fed free-choice. The mineral mixture used throughout the experiment was made according to the formula agreed upon at the conference in Atlanta in 1925. Swift and Company's 60% digester tankage was used. The shelled corn was Georgia-grown and was analyzed at the Georgia Experiment Station periodically for moisture and once for a regular feed analysis. The peanuts were analyzed the same as the corn, including the periodical moisture analyses; they were Georgia-grown and were purchased from the Southern Cotton Oil Co., Cordele, Ga.

Shipments of pigs were to be made for slaughter to Beltsville, Md., at the time of starting the peanut feeding and after 8 weeks, 12 weeks, 16 weeks and 20 weeks, respectively, on hardening feed (corn). To date of this report two shipments have been made, viz.,-the first consisting of the "check" pigs and the second consisting of those for slaughter after 8 weeks of corn hardening. The data for these two shipments are given below.

The pigs used in this experiment were quite uniform. They were all, with the exception of one, bred and raised at the Georgia Experiment Station. All were pure-bred Poland-Chinas. Sixteen of the seventeen pigs used in the experiment were from two litters both sired by the same boar and both out of sows that were litter-mates. The seventeenth pig was younger than the others but was nearly as large as many of them as he was unusually well developed. Ten of these pigs were farrowed July 10th, 6 were farrowed July 1st and the other farrowed during the latter half of August 1925. Due to the exceedingly dry weather and poor pastures these pigs were not in as "pink" condition as they would otherwise have been. However, they were well grown and far from stunted and unusually free from parasites.

After the pigs in this lot had been fed peanuts almost 8 weeks it was noticed that several of them were staggering in their gate and would sometimes fall down and seem unable to rise for several minutes. The veterinarian stated that this was due to long-continued peanut feeding. It was found necessary to give the pigs some freshly cut green soiling crops each day to overcome this condition. This green stuff consisted of oats and rye grass cut green. About a bushel per day was given. This seemed to slowly overcome this trouble. One pig died on Feb. 15th and another died Feb. 24th. It is believed from the post-mortem examinations that both of these died from the trouble already mentioned.

Check Pigs
(before fed
on peanuts)

Hardened Pigs
(after 8 weeks
on peanuts followed
by 8 weeks on corn)

Averages:

Live Weight at slaughter	62 lbs.	189 lbs.
Daily Gain during experiment	--	1.08 "
Committee Grading for Firmness	Soft	Soft
Refractive Index, Back Fat	1.4611	1.4610
" " , Leaf "	----	1.4605
Cold Dressing Percent	75.81	80.46
Ratio of Gain on Hardening Feed)	----	1.2
to Gain on Peanuts,- 1 : --)		

Mr. Russell: Are there any questions?

We will now hear from Mr. Hostetler.

Mr. Hostetler:

Cooperative Soft Pork Experiment

Lot Number	:	F
No. hogs in lot	:	24
Ration fed	:	
Peanuts	:	82.7
Alfalfa meal	:	5.0
Salt	:	.3
Lime	:	1.0
Steamed bone meal	:	1.0
Initial wt. per lot	:	1552
Ave. initial weight	:	64.7
Final wt. per lot	:	2859
Ave. final wt.	:	119.1
Total gain per lot	:	1307
Average gain per pig	:	54.4
Average daily gain per pig	:	1.03
Feed consumed	:	
Peanuts	:	3682
Alfalfa	:	223
Salt	:	13
Lime	:	45
Steamed bone meal	:	45
Cost of feed consumed.....	:	\$172.27
Feed consumed per 100 lbs. gain.....	:	
Peanuts	:	282
Alfalfa	:	17
Salt	:	1
Lime	:	3
Steamed bone meal	:	3
Cost per 100 lbs. gain	:	\$13.18
Days on feed	:	53

Mr. Russell: Are there any questions?

If not Mr. Hankins will now report on some work at Beltsville.

Mr. Hankins:

This is an experiment we finished in February of this year, a so-called "65-pound pig" experiment. These pigs were fed unshelled peanuts and mineral mixture during the softening period of 8 weeks. There were 25 pigs in the test. The average initial weight was 65.6 pounds, the average final weight was 86.6 or an average gain of 21 pounds. The average daily gain was .38 of a pound. The feed consumption per 100 pounds gain, including both peanuts and minerals, was 599.4 pounds.

The plan of this experiment was to kill after 8, 12, 16 and 20 weeks of hardening following 8 weeks softening. We have worked out the feeding results for the hardening period on the hog-days basis. I will give you just the high points. The average initial weight was 88.6 pounds, average final weight 183.9 pounds, average daily gain on corn, tankage and minerals 1.10 pounds and the feed consumption per 100 pounds gain 402.78 pounds. This shows fairly satisfactory gains during the hardening period but the feeding results during the peanut period were not so good. There were four pigs killed in the first killing, five in the second, four in the third and five in the fourth. They killed at average weights of 150, 154, 198 and 221 pounds in the four killings. The average gradings for the four killings were soft, soft, medium-soft and medium soft. The corresponding average refractive indexes were 1.4608, 1.4607, 1.4605 and 1.4602. Thus after 20 weeks of hardening we did not get down to a line between 1.4598 and 1.4599, which we are assuming is the dividing line between hard and soft.

The gains these pigs made on peanuts and corn in the first killing were 17 pounds as compared with 70, or approximately 1:4. In the second killing, 17 pounds as compared with 96, or 1:5.5. In the third killing, 23 pounds as compared with 113, which drops back to 1:5. In the last case 19 as compared to 143, or 1:7.5. There is nothing very encouraging or promising about this. It is the same old story. There is one interesting side-light to this experiment. These were good pigs, some of the best we have ever used, but we had a few in the test that did not gain well on peanuts. In other words the gains were down to 10 to 12 pounds or less through the 8-week peanut-feeding period. Of course, that is not at all satisfactory. What we might have obtained had we fed tankage or something else of the same nature with the peanuts I am not prepared to say, but I think we have a very good idea we would have gotten very much better gains than we did. However, the hardening results as I have given them to you are not very encouraging.

Mr. Russell:

We will now hear from Mr. Ellis. He has a summary of this work.

Mr. Ellis:

This is a summary of the hogs fed to date, including North Carolina, Beltsville and Georgia experiments. A few of the hogs were not in the test to compare the 65 and 75 pound pigs but were taken from the heavier weight groups. The total number of hogs is 68.

50 to 84 pound pigs.

All hogs in group :

Hogs with R.I of 1.4598
and under.

No. hogs	68	17
Days on peanuts	56	56
" " corn	88	118
Initial weight	69	66
Gain on peanuts	46	57
" " corn	130	197
Slaughter wt.	232	306
Refractive index	1.4602	1.4596
Grades		
Hard	16	6
Medium hard	9	5
Medium soft	19	5
Soft	5	1
Oily		
Gain ratio	1:2.8	1:3.5

The chart (passed around) shows the course of softening on peanuts and the subsequent course of hardening on corn and tankage. The group making an average gain of 42 pounds on peanuts required 200 pounds gain on corn to reach the medium hard stage according to the revised scale of grades. The group gaining 63 pounds on peanuts required a gain on corn similar to the other group. The ratio of gain was not as wide, however. In general, the results do not promise much hope of securing hard hogs at a reasonable market weight for the initial weight range of 50 to 84 pounds.

Mr. Russell: Are there any questions?

The next is some work from the Virginia Station and Mr. Nobles will report on that when he comes. This work we tried to get over at our station at McNeill but failed on account of crop failure. It was corn, peanuts and sweet potatoes in the same field, turning the hogs in free choice. We had two things in mind, the quality of the pork produced and what feeds would be consumed. The Virginia station undertook a piece of work this year.

That concludes the peanut part of the work.

Soybean work

Mr. Russell: We will now go on to soybeans. After soybean work we have some rice by-products and two or three other similar items. The first I have in soybeans is a hardening experiment from the South Carolina station. We will now hear from Mr. Durant.

Mr. Durant:

This is the third experiment using soybeans with a limited amount of corn. We have used two per cent of corn. These pigs were grown at the College farm and were either purebred Poland China, Berkshire or Hampshire. We had a 56 day grazing period with a limited amount of corn, followed by 12 weeks finishing period on corn and tankage. At the end of each 4 weeks 5 hogs were shipped to Beltsville.

OBJECT OF EXPERIMENT

- 1- To determine the relative economy of dry lot and forage for producing pork.
- 2- To determine the quality of pork produced on soybean forage plus 2% corn ration.
- 3- To determine the effect upon the quality of pork by following the eight week grazing period on soybeans by a finishing period of 4 to 12 weeks on corn and tankage.

PIGS USED

Twenty-five pigs averaging 36 pounds were used in this test, 10 pigs in dry lot on corn and tankage and 15 pigs on mature soybean forage. These pigs were about 12 weeks old and were either purebred Poland Chinas or Berkshire-Hampshire crosses. They were raised on the college farm and given the same feed and care before being put on test. The sows received a ration of shelled yellow corn and tankage during both the gestation and suckling period and the pigs received this same ration between weaning and the beginning of the test. The sows and pigs were on Bermuda pasture

before the pigs were put on test. The pigs were given the double treatment for hog cholera and the treatment of oil of Chemopodium for worms.

QUARTERS. SHELTER. AND WATER

Lot I. was fed in a dry lot 28 feet x 100 feet in size. Lot II. grazed on acre lots of Haberlandt 38 soybeans followed by Mammoth Yellow soybeans. Small shed type hog houses and water from pipe lines were provided for each lot.

LENGTH OF EXPERIMENT

Lot I., on corn and tankage, ran for 154 days until the pigs reached an average of 200 pounds. The pigs in Lot II. ran for 56 days on soybean forage and a finishing period from 28 to 84 days on corn and tankage.

WEIGHTS

Individual weights were taken three consecutive days at the beginning and close of the trial and every 14 days during the test.

RATIONS

Lot I. Shelled yellow corn and tankage, full feed, Morrison's

Standards

Lot II. Mature soybean forage plus 2% ration of shelled yellow

Corn for 56 days followed by a full ration of corn and tankage in dry lot during the finishing period.

COMPOSITION OF FEEDS

	Moisture	Ash	Crude Protein	Crude Fiber	Nitrogen Extract	Free	Crude Fat
Yellow corn	7.25	1.37	9.41	2.35	75.92		3.70
Tankage	9.10	23.87	61.19	1.00	-- --		5.25
Mammoth Yellow Soybeans							
Hamerlandt 38 Soy beans							

MINERALS

The pigs were given free access to the following mineral mixture

12 parts charcoal

4 parts ground lime stone

1 part salt

PRICE OF FEEDS

The cost of feeds used in this test was:

Corn \$1.12 per bushel

Tankage \$70.00 per ton

Mineral mixture \$20.00 per ton

Soybean forage \$12.00 per acre

FEED SAVED BY AN ACRE OF SOYBEANS

Based Upon Results of Soybean Period

Corn	<u>Lbs. Feed</u> 744.4	<u>Value of Feed</u> \$14.89
Tankage	<u>169.3</u> 913.7	<u>5.93</u> \$20.82

SOY BEAN PERIOD

56 Days - Sept. 1 - Oct. 27

1925

	Lot I Corn and Tankage	Lot II Soybean For- age plus 2% shelled corn
No. hogs per lot	10	15
No. days in period	56	56
Total initial wt.	366.3	537
Av. initial wt.	36.63	35.8
Total final wt.	653	1170.3
Av. final wt.	65.3	78.0
Total gain	286.7	633.3
Gain per pig	28.67	42.2
Av. daily gain	.51	.75
Total feed consumed:		
Corn	1073.65	882.0
Tankage	153.35	
Forage		2 Acres
Mineral	20	52
Av. Daily Feed:		
Corn	1.92	1.05
Tankage	.27	
Forage		.0024A
Mineral	.04	.06
Feed per 100 lbs. gain:		
Corn	374.5	139.27
Tankage	53.5	
Forage		.316A
Mineral	7.0	8.2
Cost of Feed per 100 lbs. gain:		
Corn	\$7.49	\$2.79
Tankage	\$1.87	
Forage		\$3.79
Mineral	\$.07	\$.08
Total	\$9.43	\$6.66

NOTE: Lot II 37 days on Haberlandt 38 soybeans and 19 days on Mammoth Yellow soybeans.

TABLE II.

THE FINISHING PERIOD

Lot I. 98 Days - Oct. 27-Feb.2

Lot II. 84 Days - Oct. 27 - Jany. 19

	Lot I Cor & Tankage	Lot II. Corn and Tankage
No. hogs per lot	10	10
No. days in period	98	84
Total initial weight	653	1170.3
Av. initial weight	65.3	78.0
Total final weight	2053.3	1158
Av. final weight	205.33	* 231.6
Total gain	1400.3	1450.7
Gain per pig	140.03	145.07
Av. daily gain	1.43	1.73
Total feed consumed:		
Corn	4934.35	5425.2
Tankage	515.65	594.8
Forage		
Mineral	50	63
Average daily feed:		
Corn	5.04	6.46
Tankage	.53	.71
Forage		
Mineral	.05	.075
Feed per 100 lbs. gain:		
Corn	352.38	373.97
Tankage	36.82	41.0
Forage		
Mineral	3.57	4.34
Cost of feed per 100 lbs. gain:		
Corn	\$7.05	\$7.48
Tankage	\$1.29	\$1.44
Forage		
Mineral	\$.04	\$.04
Total	\$8.38	\$8.96

* Av. of 5 pigs.

TABLE III.

ENTIRE TEST - 1925 -26

Lot I. 154 Days - Sept. 1 - Feb. 2
Lot II. 140 Days - Sept. 1 - Jany.19

	Lot I. Corn and Tankage	Lot II. Soybean Forage plus 2% Shelled Corn
No. hogs per lot	10	12
No. days in period	154	140
Total initial weight	366.3	537.0
Av. initial weight	36.63	35.8
Total final weight	2053.3	1158.0
Av. final weight	205.33	*231.6
Total gain	1687.0	2084.0
Gain per pig	168.7	173.67
Av. daily gain	1.10	1.24
Total feed consumed:		
Corn	6008.0	6307.2
Tankage	669.0	594.8
Forage		2 Acres
Mineral	70	115
Av. daily feed:		
Corn	3.90	3.75
Tankage	.43	.35
Forage		.0012 Acres
Mineral	.045	.068
Feed per 100 lbs. gain:		
Corn	356.14	302.65
Tankage	39.66	28.54
Forage		.096
Mineral	4.15	5.52
Cost of feed per 100 lbs. gain:		
Corn	\$7.12	\$6.05
Tankage	\$1.39	\$1.00
Forage		\$1.15
Mineral	\$.04	\$.06
Total	\$8.55	\$8.26

*Av. of 5 pigs.

DISCUSSION OF FEEDING RESULTS

During the forage period two varieties of soybeans were used, Haberlandt 38 and Mammoth Yellow. The dry weather during the latter part of the season reduced the yield of beans and the Mammoth Yellow, being a later maturing bean, was damaged to a greater extent than the Haberlandt 38. The pigs grazed 37 days on the Haberlandt soybeans followed by 19 days on the Mammoth Yellow.

During the soybean period the gains in both lots were rather slow. The pigs in Lot I gained .51 pounds per pig per day and required 374.5 pounds of corn and 53.5 pounds of tankage per 100 pounds gain. The pigs in Lot II gained .75 pounds per pig per day and required 139.27 pounds of corn and .316 acre of forage per 100 pounds gain. The cost per 100 pounds gain was \$9.43 in Lot I and \$6.66 in Lot II.

During the finishing period Lot I gained 1.43 pounds per pig per day and required 352.38 pounds corn and 36.82 pounds tankage per 100 pounds gain. Lot II gained 1.73 pounds per pig per day and required 373.97 pounds corn and 41.0 pounds tankage per 100 pounds gain. The cost per 100 pounds gain was \$8.38 in Lot I. and \$8.96 in Lot II.

During the entire test, including both the forage and the finishing period the pigs in Lot I gained 1.10 pounds per pig per day and required 356.14 pounds corn and 39.66 pounds tankage per 100 pounds gain. In Lot II the average daily gain was 1.24 pounds and it required 302.65 pounds corn, 28.54 pounds tankage, and .096 acre of forage per 100 pounds gain. The cost was \$8.55 in Lot I. and \$8.26 in Lot II.

RESULTS OF CARCASS TEST

The pigs in Lot II, which grazed on soybeans, with a limited ration of 2% corn for 56 days and were then finished on a full ration of corn and tankage, were shipped to Beltsville, Maryland, and slaughtered under government supervision. The committee grading is given in Table VII. The first three pigs shipped at the beginning of the soybean period killed soft. No shipment was made at the end of the soybean period and five hogs were shipped after they had been on corn and tankage for 28 days. All five hogs were soft. The five hogs that were on the finishing period for 56 days killed medium hard. In the last shipment of 5 hogs, after being on corn and tankage for 84 days, one hog killed medium hard and the other four hard.

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CONCLUSIONS

Although the gains in this test are not as large as in some of the previous trials, probably due to the smaller pigs and poor yield of beans, yet a few facts are pretty clearly brought out.

1. Pigs on soybean forage and corn made faster gains than those in dry lot on corn and tankage.

2. Pigs on forage required less feed to produce 100 pounds gain than did those in dry lot.

3. Soybean forage produced cheaper gains than the dry lot method of feeding hogs.

4. The pigs on soybean forage showed more thrift than those on corn and tankage.

5. With corn at \$1.12 per bushel and tankage \$70.00 a ton an acre of soybeans saved \$20.82 worth of feed.

Mr. Russell: Are there any questions?

Mr. Hostetler: What were the average daily gains on the hardening period?

Mr. Durant: The average daily gain for the whole length of time was 1.73. During the grazing period it was 1.75 pounds.

Mr. Russell: You had them on these two varieties of beans at different times.

Mr. Durant: In order to extend our grazing period we used two varieties.

Mr. Russell: Were the beans fairly well mature?

Mr. Durant: Yes, they were beginning to turn brown.

Mr. Russell: Could you or did you make any observation as to the possible palatability of these two varieties?

Mr. Durant: These pigs were all in the same field and we could not tell.

Mr. Russell: Mr. Ellis will now give us a summary of the South Carolina hogs.

The summary of results on the rations of soybeans plus 2+2.5 per cent corn followed by corn with tankage covers a total of 55 hogs. The initial weights ranged from 25 to 85 pounds. The results on hogs started on experiment at 85 pounds and over are included in bulletin manuscript No. 2. Of the 55 hogs in the present summary, 41 were furnished by the South Carolina station in three experiments run during the past three years. The remaining 14 hogs were chosen from experiments conducted at Beltsville. They were the animals with low initial weights which were not included in previous summaries.

The summary follows:

No. hogs:	Grading :	Initial :	Gain :	days fed :	Wt. at :	R.I. :
:	:	weight :	beans : corn :	beans : corn :	slaughter: :	Back :
	*	:	:	6	:	:
All	6-H	:	:	:	:	:
hogs	20-M-H:	:	:	:	:	:
55	15-M-S:	50.5	49.9 : 97.2	58.5	56.3	184.7
	14-S	:	:	:	:	1.460
<hr/>						
	**	Refractive Index of 1.4601 and under				
	:	:	:	:	:	:
	6-H	:	:	:	:	:
26	12-M-H :	47	59 : 124	59	71	217
	8-M-S :	:	:	:	:	1.459

*Average grading Medium Soft

**Average grading Medium Hard

The averages of grades and refractive index on the 55 hogs indicate that the majority of the carcasses were in the medium grades. Feeding period of approximately 8 weeks each on soybeans with corn and corn with tankage resulted in approximately .9 pound gain per day on the former and 1.7 pounds (nearly twice) on the latter.

A total of 26 out of the above 55 hogs had refractive indexes on the back fat of 1.4601 or less which classes them as medium hard or hard. These hogs made somewhat higher gains: the average daily gain in the first period was 1 pound and in the second (71 days) was the same as the average on the 55 hogs, namely 1.7 pounds. Thus gains of 59 and 124 pounds, a ratio of 1 to 2, was sufficient to produce carcasses of a marketable hardness.

The data on the 55 hogs has been further studied to determine the course of hardening following increasing gains on soybeans with corn. The hogs have accordingly been grouped by 25 pound intervals both as to gain on softening feed and on hardening feed.

These results are shown graphically in the accompanying chart. Some points of particular interest are

(1) The final weights of the hogs attained when a refractive index of 1.4601 is reached range from approximately 200 pounds to 260 pounds. In other words, moderately hard carcasses are secured at reasonable market weights.

(2) Low (and slow) gains on soybeans appear to require a higher ratio of gain on hardening feed than do high (and rapid) gains on soybeans (note the gain ratio to read 1.4601 or under)

(3) Generally speaking it may be concluded that pigs started on soybeans with 2-2.5 corn at initial weights of approximately 50 pounds, making gains in the neighborhood of 1 pound a day through an 8 week period will reach marketable hardness when fed corn and tankage subsequently for a 12 week period with daily gains of 1.5 pounds or more.

Mr. Russell:

Are there any questions?

We will now hear from Dr. Halverson from the North Carolina Station.

Dr. Halverson:

The first part of the report is devoted to a description of the work done during the year. It is divided into two main sections, the first of which deals with the work done in the laboratory and the second with the work done in the field.

The work done in the laboratory is described in detail, and it is found that the results are in good agreement with those obtained in previous years. The work done in the field is also described, and it is found that the results are in good agreement with those obtained in previous years.

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The Softening Effect of Oil in Peanuts and Peanut Meal:

Table I shows the general increase in softening of the body carcass of pigs of initial weight of 30, 60 and 120 pounds as the per cent of oil in the ration and the total amount of peanut oil ingested, increases. This table consists of five separate experiments conducted over a period of three years.

The low per cent of oil in the rations shown at the top of Table I are obtained by using peanut meal, corn and starch. Where higher per cents of oil in the feed are fed (due to more peanuts), no corn or starch was used. Toward the end of the table where the ration contained a considerably higher per cent of peanut oil due to more peanuts present, the amounts of oil ingested were larger, being 60 pounds or more. When the ration consisted largely of peanuts, a total of 94 to 153 pounds of oil was ingested. The body fats were then markedly affected as shown by the fat constants.

When peanuts are not fed but in place of this, peanut meal with one-third as much corn and 5 pounds of starch, the total oil ingested for the various sized pigs, is relatively low, being less than 20 pounds except in two instances. The effect of this low oil ingestion and the necessary substitution of corn and starch in the ration is reflected in the fat constants of both back and kidney fats.

Pigs thus fed are not rendered markedly soft by such low amounts of oil. This is confirmed by the fat constants. When, however, there is an ingestion of 40 to 50 pounds of peanut oil, (13 to 28 per cent of shelled peanuts in the ration) there is a marked softening effect. Both back and kidney fats are generally soft as indicated by most of the fat constants.

It was attempted to feed the various amounts of oil roughly at 4, 8, 12, 16, 20 and 36 per cent (all peanuts). The tables, however, show that it is rather the total amount of oil ingested for the entire feeding period which reflects the effect on firmness of carcass. Increased per cent of oil in the ration means more peanuts in the ration and hence a larger total oil ingestion in a shorter feeding period. Conversely a smaller per cent of oil in the ration (depending upon the amount of peanuts used) may be fed over a longer period and yet give the same amount of total oil ingestion as occurs in feeding smaller pigs such rations over a longer period of time. Similar softening results are then obtained.

In the softening rations given in Table I, the oil in the peanut appears to be the chief softening agent. When the total amount of peanut oil ingested increases, the effect on the condition of the body fat, both back and kidney, is reflected by the fat constants.

The Effect of a Hardening Ration due to Carbohydrates-Chiefly Starch:

Table II gives the results of check pigs fed a hardening ration consisting of corn with supplements which was conducted at the same time in the five experiments given in Table I. Two additional experiments, V and XIII are included. The pigs in these experiments were also fed corn or Brewer's Rice in the subsequent hardening period following peanut feeding.

Attention is called to the total oil intake for each pig. This is relatively low and does not exceed 20 pounds except in the case of Pig No. 6 in Experiment IV. The energy derived from the oil and the high per cent of protein in the rations given in Table I are here furnished by the carbohydrates in corn and Brewers Rice which consist principally of starch. The effect of the carbohydrate on the fat constants of both the back and kidney fats is clearly shown. These constants indicate firm carcasses. Pigs Nos. 4, 5, and 6 in Experiment XIII, of an average initial weight of 32 pounds, were fed Brewers Rice. At an average weight of 145 pounds final weight they killed hard.

Experiment V shows the effect on carcasses of pigs when Brewers' Rice or Starch is substituted for corn or shorts or for both in the ration or for peanuts used in peanut feeding. In the ration of Pig 5, commercial starch was substituted with good hardening effect. However, more hardening was obtained on Pigs 2, 3, and 4 when Brewers Rice was used.

The per cent of oil in the rations of these pigs in Experiment V and the total amount of oil consumed is low, with carbohydrate constituting the greater part of the ration. The firmer carcasses are from those pigs receiving the greater amounts of Brewers Rice. The physical grading is confirmed by the fat constants. The results of these experiments suggest that the absence of a softening oil in the ration and the presence of carbohydrate are factors which cause hardening.

Effect on Firmness of Carcass by Different Methods of Feeding

Hardening and Softening Feeds:

Having determined the effect on firmness of body fat of peanut oil and of the starchy cereals, corn and Brewers Rice in the ration, it was decided to ascertain the effect on firmness of body fat of the following two methods of feeding:

First: By feeding a peanut softening ration followed by a hardening ration consisting of corn or Brewers Rice.

Second: By feeding peanuts and corn or Brewers Rice in equal amounts in the same ration throughout the experiment.

Table III illustrates the first method of feeding pigs of initial weights of 120, 60 and 32 pounds in which the amount of softening feed can be approximately calculated from the total oil intake and from the per cent of oil in the ration. The total oil intake shows that considerable amounts of shelled peanuts were eaten. The chemical grading based upon the constants of both back and kidney fats, show that there was a fairly satisfactory hardening of both the back and kidney fats.

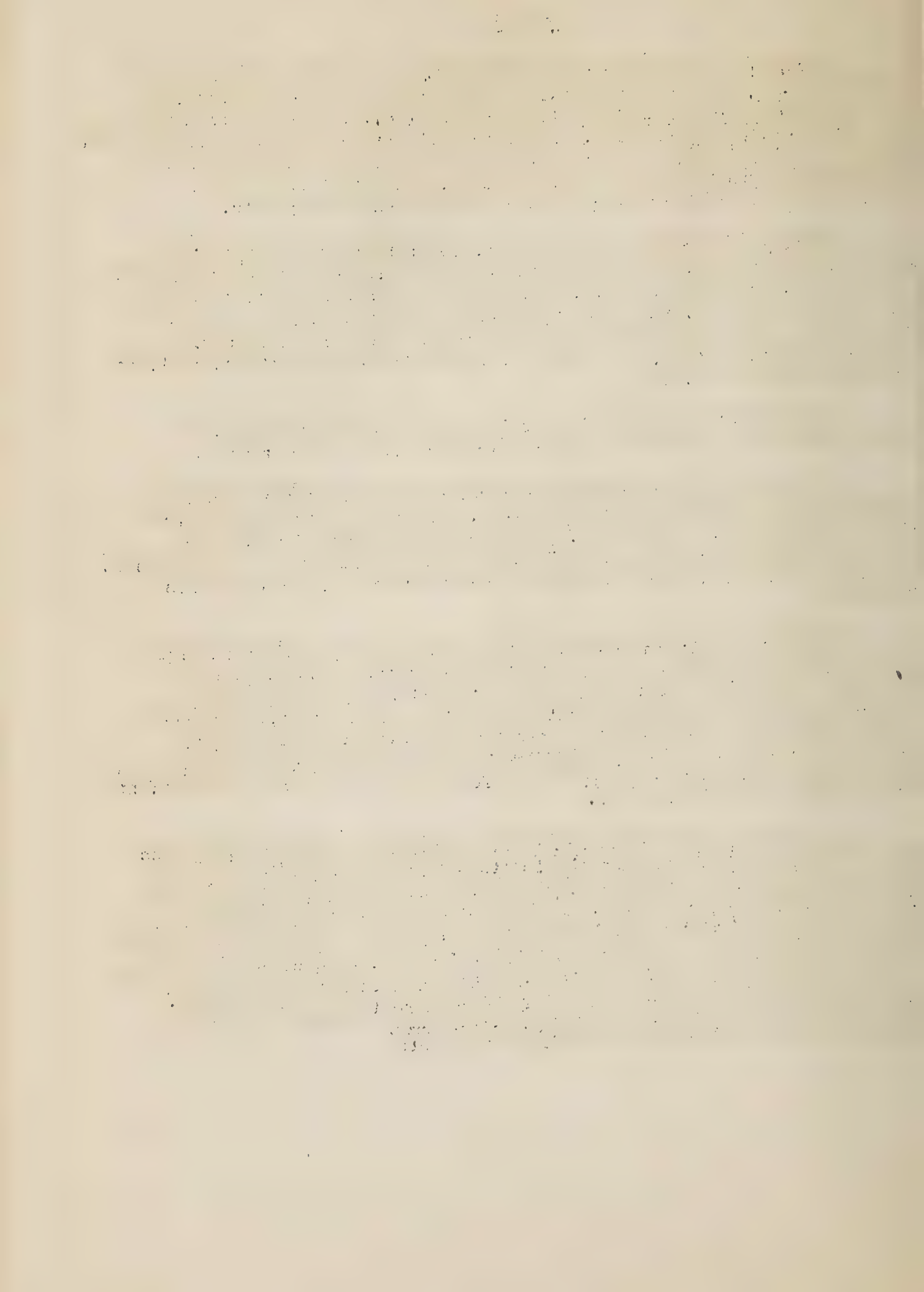
There is a tendency, however, for the refractive index of the back fats to lag behind the other fat constants in the hardening process. The results, together with other factors, are considered satisfactory on the 12 pigs comprising four experiments conducted during a period of two years. It was not planned to carry these pigs for a long period on the hardening ration, but rather to obtain hardening with the smallest possible amount of feed.

In Table IV are given the results of the second method, where equal amounts of peanuts and Brewers Rice were fed in the ration.

The pigs in these experiments received the same total amount of peanuts and of Brewers Rice as the pigs in the first method of feeding shown in Table III. But pigs 4, 5, and 6 in Experiment X which ate more feed than did pigs 1, 2, and 3 in the same experiment are an exception. The larger feed consumption increased the amount of oil and of starch ingested.

All pigs fed by the second method graded softer than those pigs fed by the first method. The constants of both back and kidney fats are quite uniformly affected and show more softening than when the hardening ration is fed subsequent to peanuts. The refractive indices of the back fats in Experiments X and XII are quite high compared to those of the pigs in the same experiment (Table III) where they are fed an equal total amount of softening feed and subsequently an equivalent total amount of hardening feed.

In general, the amount of hardening which has taken place in each pig is surprisingly large when the length of time on hardening feed and the amount of gain is compared with the time and gains made by the pigs on the softening peanut ration. The amount of peanut oil consumed by each pig is rather high. The large amount of peanut oil ingested is shown (Table IV) by Pigs 4, 5, and 6 in Experiment X. They consumed 83 to 86 pounds of peanut oil in 90 days or an average of 0.94 pound per day. There is some indication that the refractive index of back fat lags somewhat behind the other constants of the body fats where the pigs are fed the hardening ration following the feeding of peanuts.



SUMMARY:

1. The effect on body carcass of the softening feed, peanuts, in individual feeding, is shown for 30, 60, and 120 pound pigs. This effect is roughly dependent upon the total amount of peanuts eaten as indicated by the total amount of peanut oil ingested.
2. The effect of the hardening feeds, corn and Brewers Rice, in the ration on the firmness of carcass is most pronounced. Indications are that this effect depends upon the amount of the carbohydrate starch present, and upon the absence in the ration of a softening oil.
3. Greater hardening effects on carcasses of 120, 60 and 35 pound pigs are obtained as shown by the fat constants of both back and kidney fats, when the softening peanut ration is first fed and subsequently followed by the hardening ration of Brewers Rice. A greater softening effect is obtained when equal amounts of these same feeds are fed together in the ration throughout the experimental period to pigs of similar size and weight.

Table 1 - Effect on softness of carcass of 30, 60 and 120 pound pigs on various planes of peanut oil fed in form of shelled peanuts.

Expt. and pig number	Weight		Ave. daily gain	Oil intake		Grading physical *	Back Fat		I. No.	Leaf Fat		Rations **	
	Initial	Final		per cent	pounds		Ref. Index			Ref. Index		Pnt. Meal	Corn
9-3	39	188	1.00	6.27	31.38	H	1.4592		70.3	1.4587		65	20
4-1	56	195	1.27	3.65	15.30	-	1.4618		65.6	1.4602		65	20
4-3	53	127	.60	5.22	16.03	S	1.4608		79.1	1.4598		65	20
3-1	122	223	1.33	3.48	10.20	M-H	1.4613		67.2	1.4596		65	20
2-1	163	259	1.37	5.78	22.00	M	1.4605		69.6	1.4594		65	20
													Peanuts
9-4	33	155	.75	10.62	42.21	S	1.4608		74.5	1.4595		53	17
6-4	61	172	.87	9.93	39.58	S	1.4601		73.1	1.4596		53	17
3-2	123	222	1.30	9.58	34.00	S	1.4622		72.7	1.4597		55	15
2-2	155	257	1.46	10.58	38.00	S	1.4611		74.1	1.4602		55	15
4-2	58	191	1.22	9.35	38.10	S	1.4621		76.2	1.4613		55	15
9-5a	37	134	.59	14.83	43.47	O	1.4611		82.6	1.4609		50	30
3-3	121	234	1.49	14.07	50.10	S	1.4622		73.4	1.4609		52	28
9-5	36	196	.98	16.02	69.59	O	1.4614		85.1	1.4610		50	30
6-5	63	200	1.07	13.93	55.69	S-O	1.4614		80.5	1.4603		50	30
4-3	64	215	1.39	12.77	53.40	O	1.4630		75.6	1.4620		52	28
2-3	154	253	1.41	15.48	57.00	-	1.4614		72.9	1.4603		52	28
6-6	66	201	1.02	17.36	73.10	S-O	1.4609		80.7	1.4600		42	42
4-4	64	202	1.27	16.68	70.80	S	1.4630		82.8	1.4620		44	39
3-4	127	233	1.39	18.00	53.00	S	1.4625		78.6	1.4616		44	39
2-4	143	258	1.64	19.79	71.00	-	1.4617		78.2	1.4605		44	39
6-7	68	178	1.04	20.74	68.00	O	1.4613		86.0	1.4608		20	61
6-7a	83	184	.95	20.74	66.68	O	1.4612		87.3	1.4608		20	61
9-6	42	228	1.18	18.87	94.46	O	1.4611		84.1	1.4602		42	42
9-6a	43	223	1.14	18.87	94.65	O	1.4611		84.6	1.4606		42	42
6-8	68	181	1.07	28.20	84.13	O	1.4615		87.6	1.4612		5	85
6-8a	87	207	1.13	28.23	83.13	O	1.4612		86.4	1.4610		5	85
9-2	41	230	1.20	36.54	152.50	O	1.4622		94.0	1.4615		-	93
4-5	75	245	1.56	37.66	151.00	O	1.4632		92.3	1.4624		-	100
6-2	80	171	.74	37.96	94.10	O	1.4618		91.5	1.4615		-	100
3-5	119	232	1.49	40.72	124.10	S-O	1.4633		83.0	1.4622		-	100
2-5	142	275	1.90	43.22	137.00	-	1.4625		85.9	1.4618		-	100

* All of the hogs reported in these experiments were slaughtered at the North Carolina Station. The carcasses were graded by a representative of that station.

** With the exception of the last 5 pigs, all pigs received in addition to the feeds listed in the table, 10 parts skim milk powder, 10 parts tankage and 5 parts alfalfa meal. In certain cases, they received small amounts of starch. Pigs 9-4 to 4-2 also received 18 parts corn. The amount of peanuts increased until it constituted the entire grain ration of the last 4 pigs. Pig 9-2 received 5 parts alfalfa, 93 parts peanuts and 1 part each steamed bone meal and chalk. In most cases, a small allowance of salt was included in the ration.

Table 2 - The influence of the starchy cereals, corn and brewers' rice, on the hardness of carcasses of 30, 80, and 100 pound pigs.

Expt. and pig	Weight		Ave. daily	Oil Intake		Grading	Back Fat	Leaf Fat	
number	: Initial	: Final	: gain	: per cent	: pounds	: Physical	: Ref. Index	: I. No.	: Ref. Index.
Ration of carn, 60; tankage, 5; 1, 3. meal, 5; with starch, shorts, alfalfa.									
9-1	36	188	.93	3.57	19.52	H	1.4590	68.20	1.4579
4-6	84	273	1.73	3.58	23.70	H	1.4600	64.70	1.4591
6-1	85	227	1.11	3.53	18.67	M-H	1.4600	72.20	1.4582
3-6	105	217	1.47	2.85	9.70	H	1.4601	67.50	1.4595
5-1	109	238	1.74	2.72	9.22	H	1.4595	65.02	1.4587
13-1	34	145	.83	2.86	11.53	M-H	1.4599	70.46	1.4587
13-2	31	146	.86	2.86	11.52	M-H	1.4594	66.80	1.4583
13-3	29	119	.68	2.86	11.28	M-H	1.4597	68.50	1.4585
Ration of brewers' rice 56.7; tankage, 5; 1. s. meal, 5; shorts 30; alfalfa, 5.									
13-4	34	148	.86	1.16	4.46	H	1.4586	59.68	1.4575
13-5	30	149	.89	1.16	4.67	H	1.4590	63.49	1.4579
13-6	31	144	.85	1.16	4.62	H	1.4589	63.39	1.4580
The following received modifications of the above ration. See below.									
5-2	101	236	1.82	2.84	9.26	H	1.4588	56.13	1.4580
5-3	100	231	1.77	1.38	4.54	H	1.4581	51.58	1.4578
5-4	93	238	1.96	.80	2.41	H	1.4583	61.13	1.4578
5-5	93	178	1.15	1.47	5.42	H	1.4595	64.61	1.4590
Pig 5-2 received corn, 60; rice, 23; tankage, 10; L. S. meal, 5; alfalfa, 5.									
" 5-3	"	"	86;	"	10;	"	5;	"	5.
" 5-4	"	"	86;	"	5;	Sk. milk pwd	5;	"	5.
" 5-5	"	starch; 75.1	"	20;	"	"	10;	"	5.

All but two pigs received salt and chalk.

Table 3 - The effect of definite amounts of the hardening feeds, brewers' rice and corn; following peanuts to 30, 60 and 120 pound pigs.

Expt. and pig number	Initial weight	Days on feed : soft - hard	Gain on : soft - hard	Oil Intake * : per cent	Intake * : pounds	Grading : physical	Back Fat : Ref. Ind. : I. No.	Leaf Fat : Ref. Index	Rations** : Peanuts : Brewers' rice :
Brewers' rice, alfalfa, minerals following peanuts, alfalfa, minerals.									
7-9	: 140	: 76 - 69	: 56 - 1	: 35.92	: 66.48	: M-S	: 1.4608	: 78.15	: 1.4590 : 100 : 100 :
2/14/23 -11	: 120	: 76 - 38	: 80 - 50	: 28.33	: 65.05	: H	: 1.4599	: 69.80	: 1.4592 : 80 : 80 :
10-1	: 121	: 52 - 54	: 86 - 63	: 36.11	: 69.40	: H	: 1.4610	: 69.97	: 1.4600 : 82.7 : 82.3 :
1/31/24-0	: 125	: 52 - 54	: 82 - 65	: 36.74	: 71.31	: H	: 1.4602	: 69.73	: 1.4597 : 82.7 : 82.3 :
1/31/24-3	: 111	: 52 - 54	: 85 - 64	: 36.46	: 68.18	: H	: 1.4604	: 72.87	: 1.4598 : 82.7 : 82.3 :
12-1	: 66	: 55 - 41	: 74 - 48	: 31.15	: 48.50	: H	: 1.4610	: 65.15	: 1.4599 : 82.7 : 82.3 :
6/27/24-2	: 67	: 55 - 41	: 62 - 53	: 31.15	: 48.50	: H	: 1.4619	: 67.51	: 1.4597 : 82.7 : 82.3 :
6/27/24-3	: 57	: 55 - 41	: 69 - 57	: 31.15	: 46.91	: H	: 1.4615	: 61.72	: 1.4598 : 82.7 : 82.3 :
6/6/23-11	: 32	: 77 - 91	: 91 - 113	: 32.07	: 37.99	: -	: 1.4579	: 57.82	: 1.4571 : 92.7 : 92.7 :
6/6/23-12	: 36	: 77 - 91	: 94 - 110	: 32.07	: 39.58	: -	: 1.4577	: 56.82	: 1.4571 : 92.7 : 92.7 :
Corn, alfalfa, minerals, following peanuts, alfalfa, minerals.									
1-9	: 32	: 77 - 85	: 93 - 104	: 32.07	: 48.54	: -	: 1.4590	: 68.44	: 1.4582 : 92.7 : 92.7 : Corn :
6/6/23-10	: 32	: 77 - 91	: 93 - 111	: 32.07	: 49.65	: -	: 1.4589	: 65.89	: 1.4579 : 92.7 : 92.7 :

*Oil intake given for peanut period only. Pigs receiving brewers' rice had an intake varying from 0.47 to 1.39 per cent, while those receiving corn had an intake of 3.24 per cent.

** With the exception of the first two pigs fed special mixtures, all pigs received during both periods, 1 part each of chalk and bone meal, 5 parts alfalfa and 0.3 part salt.

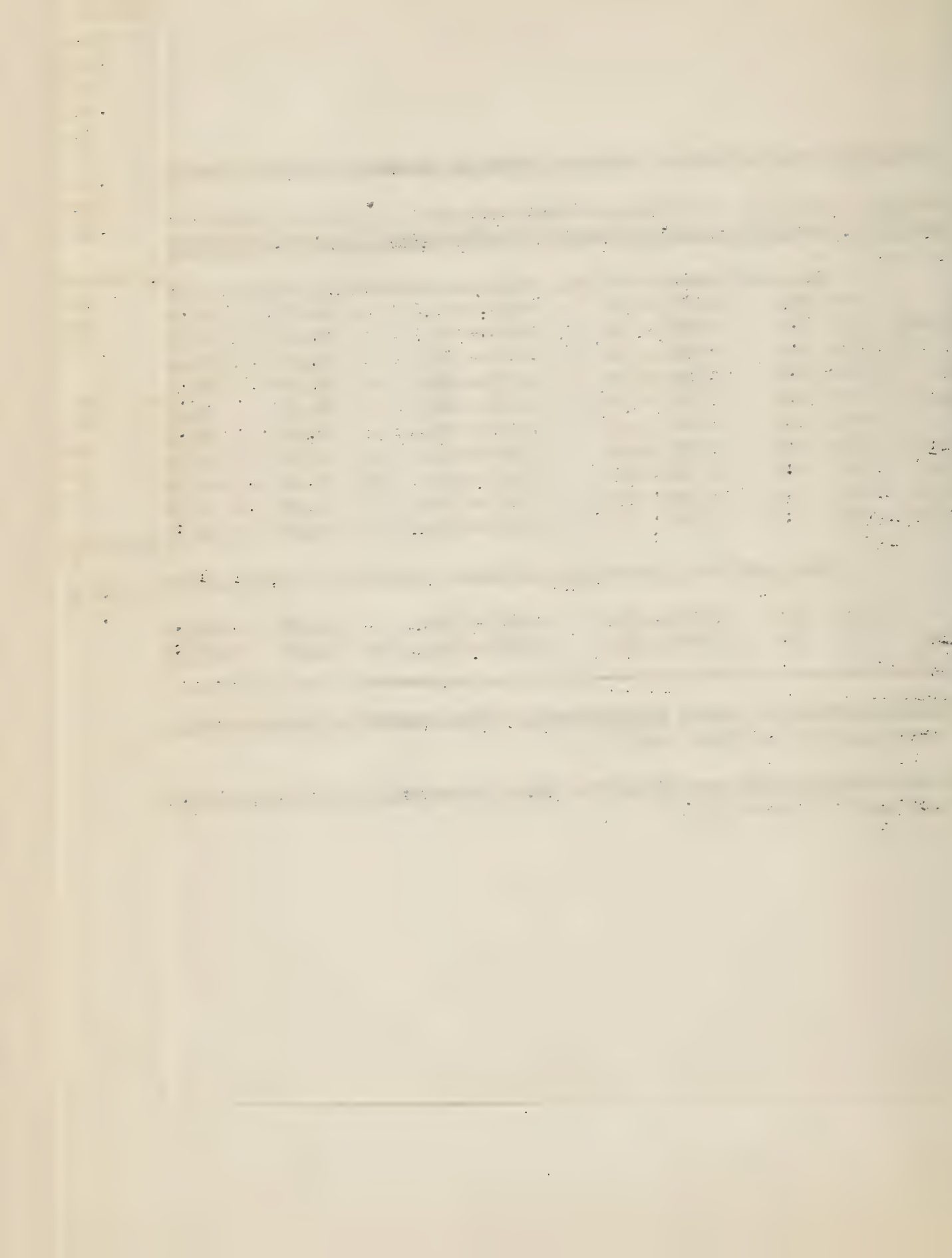


Table 4 -- The effect of equal amounts of peanuts and brewers' rice in the ration upon 60 and 120 pound pigs.

Expt and pig number	Weight		Ave. daily gain	Oil Intake		Grading	Back Fat		I. No.	Leaf Fat		Peanuts	Brewers' rice
	Initial	Final		per cent	pounds		Ref. Index			Ref. Index			
7-10a	124	253	1.53	17.12	61.27	S	1.4604	78.05		1.4598		50	50
7-12	114	249	1.18	15.33	65.14	M	1.4610	77.93		1.4598		40	40
10-4	114	266	1.71	18.12	85.60	M-H	1.4620	79.94		1.4615		41.3	41.3
10-5	128	272	1.62	18.12	82.95	M-H	1.4620	77.86		1.4613		41.3	41.3
10-6	109	267	1.78	18.12	85.60	M-H	1.4617	75.22		1.4611		41.3	41.3
12-4	64	181	1.22	17.28	48.76	M-H	1.4642	69.30		1.4617		41.3	41.3
12-5	66	200	1.40	17.28	54.57	M-H	1.4627	69.91		1.4611		41.3	41.3
12-6	60	191	1.36	17.28	53.37	M-H	1.4635	76.69		1.4615		41.3	41.3

Pig 7-10a also received 1 part salt and pig 7-12 received 1 part salt, 10 parts each of skim milk powder and tankage and 5 parts alfalfa. The remainder received 1 part each chalk and steamed bone meal, 5 parts alfalfa and 0.3 parts salt.

Mr. Hankins: Dr. Halverson, may I ask a question? What was the maximum refractive index obtained?

Dr. Halverson:

The refractive index for 119 pound hogs carried to 232 pounds was 1.4633 and on 75 pound hogs carried to 245 pounds, both on peanuts with supplements, was 1.4632. The highest refractive index on 41 pound pigs carried to 230 pounds was 1.4622. The highest refractive index was 1.4633. On a group of 5 pigs where the amount of oil was from 36 to 40 per cent the amount ingested was from 100 to 150.

Mr. Salmon:

What is the ratio between your gains on softening and hardening feeds?

Dr. Halverson: The ratio is 85 pounds on softening and about 65 pounds on hardening. It is less when we get considerable hardening. That is on 125 pound pigs. In the next experiment where we used half that size hog they were from 72 to 74 and on hardening 57.

Mr. Hankins: What is the percentage of oil in the softening ration?

Dr. Halverson: It is around 17 per cent.

Mr. Russell: Are there any questions?

The next heading is one in which a considerable amount of work has been carried on, that is hogging-down corn and soybeans. It is the farmers plan of feeding reduced to experimental work. We have eight or nine stations in that work. The first on the list is Alabama. We will now hear from Mr. Salmon:

Mr. Salmon: This is a mighty short experiment and it will not take long to report the results.

This years experiment was on the hogging-down of corn and soybeans. The corn was planted in rows, 6 feet apart with a row of soybeans between each 2 rows of corn. The variety of soybeans was Mammoth Yellow. The year was extremely dry and both the corn and beans suffered from lack of moisture. The corn was damaged more than the beans. The yield was not determined but it was estimated that the corn would yield about 10 - 11 bushels per acre and the beans 4 - 5 bushels per acre.

The hogs were turned on the beans September 10. At this time the corn was dry and the beans in the hard-dough stage. It may be mentioned that the hogs were fed cut soybeans a few days before they were turned into the field. The corn was eaten more readily than the beans and was always cleaned up before the beans. The hogs were kept in the lot however until the beans were practically exhausted.

TABLE 1.

Average Weights and Gains of Hogs in Corn-Soybean Field.

September 10 to October 26, 1925 - 46 days

No. of hogs in lot	20
Total initial Wt.	2,232 Lbs.
Average initial Wt. per hog	116.6 Lbs.
Average final Wt. per hog	210.5 Lbs.
Average gain per hog	98.9 Lbs.
Average daily gain per hog	2.15 Lbs.
Yield of pork per acre	235 Lbs.

A mineral mixture was kept before the hogs at all times

Bone meal	25 Lbs.
Marble dust	25 Lbs.
Salt	25 Lbs.
Charcoal	25 Lbs.
K I	4 Oz.

All of the hogs were thrifty and as shown by Table I they made exceptionally good gains.

SLAUGHTER DATA

The 3 checks were graded soft by the committee. The refractive indexes were 1.4600, 1.4601, and 1.4604, respectively, or an average of 1.4602, indicating medium soft carcasses.

Of the 20 hogs that were fed 46 days, 8 were hard, 11 were medium hard, and 1 was medium soft, as graded by the committee.

The average refractive index was 1.4597, all but 3 being below 1.4600. One of these was 1.4600 and the other two 1.4601.

Compared with the checks, these hogs had become slightly harder during the 46 days in the corn-soybean field.

Mr. Russell: Are there any questions?

Mr. Templeton: Did you get an estimate on the yields of corn and beans?

Mr. Salmon: We estimated it at 10 to 11 bushels corn and 4 to 5 bushels of soybeans.

Mr. Russell: We will now hear from Mr. Robison from the Ohio Station.

Mr. Robison:

The Ohio Station did not enter the cooperative soft pork work until after the conference was held last year. During the summer outlines of the various experiments that had been planned for the year were sent to Mr. Hankins. He informed us that the one which seemed to offer the best possibilities of fitting into the experimental program for the year outlined by the agencies cooperating in the soft-pork investigations was a tentative hogging-down experiment in which five lots were to be fed.

In this experiment the following rations were fed:

1. Standing corn containing soybeans plus tankage and minerals.
2. Standing corn plus tankage and minerals.
3. Standing corn containing soybeans, plus minerals.
4. Standing corn plus minerals.
5. Standing corn containing soybeans.

The pigs used for the experiment consisted of 5 thin but thrifty cross-bred Duroc-Tanworth pigs from the Station herd and 3 somewhat smaller pure-bred Poland China pigs to the lot. Three of the latter were purchased from a neighboring farmer just before the experiment was started.

The others came from the herd of a man in an adjoining community and were purchased the last of June.

Each plot hogged down contained an acre. The yield of corn was estimated by harvesting two representative rows from each plot and determining the weight of this corn and the per cent of moisture free shelled corn it contained.

Soybeans of the Elton variety were used. An attempt was made to estimate their yield by pulling, drying, and hulling the beans from two representative rows. The corn was drilled and an unusually thick stand was secured. Unfortunately, although the beans made a reasonable growth of vines, possibly because they were so shaded by the corn, they yielded only a meager quantity of beans.

There was some difference in the time at which the various lots cleaned up their respective plots. Those through first were continued on the same kind of feeds they had been receiving until November 16, when all of the lots were ready to ship. The pigs were turned on the corn September 29 and were thus on the test for practically 7 weeks. Table II gives the results secured.

(Table II)

Two of the three pigs sent to Beltsville at the beginning of the experiment as representatives of those to be used on the test killed out soft and the other one medium soft.

With the exception of those in the lot getting standing corn and soybeans without minerals, one pig in each lot was graded as medium-hard and the remainder as hard. Five of the pigs on standing corn and soybeans killed out hard, one medium hard one medium soft and one soft.

During the winter the samples of soybeans were hulled and, as previously mentioned, the yields of beans were found to be very low. The pigs had cleaned up what few beans there were but these only amounted to 2.6, 4.1 and 3.4 per cent of the total rations, respectively.

1890

1890

1890

1890

1890

1890

1890

1890

Hogging Down Corn, Supplemented with Minerals, Soybeans and Tankage.
Exp. 570; Dept. of Animal Industry, Ohio Experiment Station.

	Lot I	Lot II	Lot III	Lot IV	Lot V
	Standing	Standing	Standing	Standing	Standing
	corn	corn	corn	corn	corn
	soybeans	tankage	soybeans	and	and
	tankage	and	and	minerals	soybeans
	and	minerals	minerals		
	Minerals				
Variety of soybeans	Elton		Elton		Elton
Area hogged down -- acres	1	1	1	1	1
No. of pigs	8	8	8	8	8
From Sept. 29, 1925 to	Nov. 4	Nov. 14	Nov. 7	Nov. 14	Nov. 3
Pig days	288	368	312	368	280
Initial weight	787.5	789.33	787.5	787.83	788.8
Average initial weight	98.44	98.67	98.44	98.48	98.6
Final weight	1479.5	1565	1461.5	1457	1342
Average final weight	184.94	195.62	182.69	182.125	167.7
Total gain	692	775.67	674	669.167	553.1
Average daily gain	2.40	2.11	2.16	1.82	1.9
Feed:					
corn (15.5% moisture)	3097.60	3631.36	2982.71	3713.83	2863.97
tankage	89.60	152	-----	-----	-----
soybeans	86.60	---	129.80	-----	101.20
minerals*	10	14.8	20	24.50	-----
block salt	3	2	1.70	2.80	2
total	3286.80	3800.16	3134.21	3741.13	2967.17
Daily feed per pig:					
corn	10.76	9.87	9.56	10.09	10.22
tankage	.31	.41	---	-----	-----
soybeans	.30	-----	.42	-----	.36
minerals	.03	.04	.06	.07	-----
block salt	.01	.005	.005	.008	.00
total	11.41	10.33	10.05	10.17	10.60
Feed per 100 lb. gain:					
corn	447.63	468.16	442.54	554.99	517.74
tankage	12.95	19.59	-----	-----	-----
soybeans	12.51	-----	19.26	-----	18.30
minerals	1.45	1.91	2.97	3.66	-----
block salt	.43	.26	.25	.42	.36
total	474.97	489.92	465.02	559.07	536.40

* Minerals- salt, 1; ground limestone, 2; raw bone meal, 2.

Per cent of soybeans in ration 2.62%
Parts corn to soybeans 35.8:1

4.14%
23.1

3.41%
28.3:1

Exp. 570; Dept. of A. I., O.A.E.S.; Summary of Lots 1, 3 and 5 from close of Experiment until Shipped to Beltsville.

	Lot I	Lot II	Lot III	Lot IV	Lot V
	New ear		New ear		New ear corn
	corn,		corn		and
	soybeans,		soybeans		soybeans
	tankage		and		
	and		minerals		
	minerals				
From	Nov. 4, 1925		Nov. 7, 1925		Nov. 3, 1925
To	Nov. 16		Nov. 16		Nov. 16
No. of pigs	8		8		8
Pig days	96		72		104
Initial weight	1479.5		1461.5		1342
Average initial weight	184.94		182.69		167.75
Final weight	1692.5		1603.5		1505.5
Average final weight	211.56		200.44		188.19
Total gain	213		142		163.5
Average daily gain	2.22		1.97		1.57
Feed:					
corn (15.5% moisture)*	820.55		429.10		651.42
tankage	41.6		-----		-----
soybeans	40		40		40
minerals	3.9		3.90		--
total	906.05		473.00		691.42
Daily feed per pig:					
corn	8.55		5.96		6.26
tankage	.43		----		----
soybeans	.42		.56		.39
minerals	.04		.05		----
total	9.44		6.57		6.65
Feed per 100 lb. gain:					
corn	385.23		302.18		398.42
tankage	19.53		-----		-----
soybeans	18.78		28.17		24.47
minerals	1.83		2.75		-----
total	425.38		333.10		422.89

*Shelled basis.

Exp. 570, Dept. of A.I.; Ohio Agricultural Experiment Station.
Summary From Beginning of Experiment until Shipped to Beltsville.

	: Lot I	: Lot II	: Lot III	: Lot IV	: Lot V
	: Corn	: Corn	: Corn	: Corn	: Corn and
	: Soybeans	: tankage	: soybeans	: and	: soybeans
	: tankage	: and	: and	: minerals	:
	: and	: minerals	: minerals	:	:
	: minerals	:	:	:	:
	:	:	:	:	:
From	: Sept. 29-'25	: Sept. 29-'25	: Sept. 29-'25	: Sept. 29-'25	: Sept. 29-
To	: Nov. 16	: Nov. 14	: Nov. 16	: Nov. 14	: Nov. 16
No. of pigs	: 8	: 8	: 8	: 8	: 8
Pig days	: 384	: 368	: 384	: 368	: 384
Initial weight	: 787.5	: 789.33	: 787.5	: 787.83	: 788.83
Average initial weight	: 98.44	: 98.67	: 98.44	: 98.48	: 98.60
Final weight	: 1692.5	: 1565	: 1603.5	: 1457.	: 1505.5
Average final weight	: 211.56	: 195.62	: 200.44	: 182.12	: 188.19
Total gain	: 905	: 775.67	: 816	: 669.17	: 716.67
Average daily gain	: 2.36	: 2.11	: 2.12	: 1.82	: 1.87
Feed:	:	:	:	:	:
Corn (15.5% moisture)	: 3918.15	: 3631.36	: 3411.81	: 3713.83	: 3515.39
tankage	: 131.20	: 152	: -----	: -----	: -----
soybeans	: 126.60	: ---	: 169.80	: -----	: 141.2
minerals*	: 13.90	: 14.8	: 23.90	: 24.5	: ---
block salt	: 3	: 2	: 1.70	: 2.8	: 2
total	: 4192.85	: 3800.16	: 3607.21	: 3741.13	: 3658.59
Daily feed per pig:	:	:	:	:	:
corn	: 10.29	: 9.87	: 8.88	: 10.09	: 9.15
tankage	: .34	: .41	: ---	: ---	: ---
soybeans	: .33	: ---	: .44	: ---	: .37
minerals	: .04	: .04	: .06	: .07	: ---
block salt	: .008	: .005	: .004	: .008	: .005
total	: 10.92	: 10.33	: 9.39	: 10.17	: 9.53
Feed per 100 lb. gain:	:	:	:	:	:
corn	: 432.94	: 468.16	: 418.11	: 554.99	: 490.52
tankage	: 14.50	: 19.59	: -----	: -----	: -----
soybeans	: 13.99	: ---	: 20.81	: -----	: 19.70
minerals	: 1.54	: 1.91	: 2.93	: 3.66	: ---
block salt	: .33	: .26	: .21	: .42	: .28
total	: 463.30	: 489.92	: 442.06	: 559.07	: 510.50

* Minerals = salt, 1; ground limestone, 2; raw bone meal, 2.

Per cent of soybeans in ration	3%	4.7%	3.9%
Parts corn to soybeans	30.9:1	20.1:1	24.9:1

Mr. Russell: We will now hear from Mr. Vestal.

Mr. Vestal:

During the fall of 1925 three lots of hogs were used in a hogging-off experiment to compare soybeans grown in the field and tankage as supplements to corn hogged off. Also to determine the value of adding minerals to a ration of corn and soybeans hogged off. Well grown feeder hogs averaging approximately 113 pounds were used in this experiment. They were started on feed September 19 and fed for a period of 56 days. Twenty hogs were fed in each lot. The lots and rations were as follows:

Lot 1. Corn hogged off and tankage self fed

Lot 2. Corn and soybeans grown together and hogged off

Lot 3. Corn and soybeans grown together and hogged off

Mineral mixture fed in self feeder.

All lots had access to pressed block salt.

The mineral mixture was composed of 10 parts wood ashes, 10 parts 16% acid phosphate and 1 part common salt by weight.

Manchu variety of soybeans was used.

Following the feeding period 18 hogs from each lot were shipped to the Beltsville Station for slaughter and carcass tests.

The hogs fed corn and tankage made an average daily gain of 1.99 pounds to the hog. The Committee grading was 15 hard, 2 medium hard and 1 medium soft. The refractive index figures showed 10 hard and 8 medium hard.

The hogs fed corn and soybeans made an average daily gain of 1.69 pounds to the hog. The committee grading was 8 hard, 6 medium hard, 2 medium soft and 2 soft. The refractive index figures showed 9 hard, 5 medium hard, 2 medium soft and 2 soft.

The hogs fed corn, soybeans and mineral made an average daily gain of 1.86 pounds to the hog. The committee grading was 13 hard, 4 medium hard and 1 medium soft. The refractive index figures showed 13 hard, 4 medium hard and 1 medium soft.

The committee grading showed the check pigs to be 2 soft and 1 medium soft. The refractive index figures showed 3 soft.

Mr. Russell: Are there any questions?

Mr. Vestal what was the average daily gain where you fed minerals?

Mr. Vestal: The average daily gain with minerals was 1.68 and without minerals was 1.29. In a previous experiment we got 1.77 with mineral and 1.03 without mineral.

Mr. Russell: We will now hear from Dr. Jacob of the Tennessee station.

Dr. Jacob: Due to conditions I doubt very much if there should be a report made of last year's work. I question whether it has any experimental value at all. We experienced such a drouth that it simply meant that our crops were practically nothing. However, we did not want to disappoint everybody so we did include a few pigs.

There were 2 check pigs slaughtered in connection with this experiment. They weighed 120 and 154 pounds at slaughter. The lighter pig was graded as soft with a refractive index of 1.4594 and the heavier pig was graded as hard, the refractive index being 1.4590. Six pigs were placed on the crops of corn and soybeans (Tokio variety) and the hogging-down period continued for 56 days. Due to the shortage of the crop it was necessary to hand feed some corn during the last 2 weeks of the period. At the close of the experiment the 6 hogs were shipped to Beltsville and slaughtered at an average live weight of 179 pounds. All were graded as hard by the committee, and the average refractive index for the 6 was 1.4598. The six pigs started on experiment at an average weight of 151 pounds and gained an average of 35 pounds during the 8 week period.

Mr. Russell: Are there any questions?

Mr. Hankins will now read the report of the Pennsylvania Station.

Mr. Hankins: This report was prepared by Mr. Grimes of the Pennsylvania Station.

The object of the work conducted at this station during 1925 was as follows:

1. To compare gains made from a ration of corn and tankage and corn and soy beans.
2. To determine the effect produced upon the carcass when the above rations are fed.
3. To determine if there is any difference in the degree of palatability of 4 varieties of soy beans when grazed in the corn field.

In order to procure information on the above, eight acres of land was planted to corn and soy beans and 2 acres to corn alone during May 1925. In the corn and bean area, four varieties; 2 acres each of Manchou, Ebony, Medium Green and Illinois 1319 beans were grown. With the exception of the Illinois 1319, all beans were planted at the time the corn was drilled. This variety was put in 5 days later than the rest due to the fact that difficulty was experienced in securing seed. Four colors - yellow, black, green and brown were represented in these varieties. The stand of corn in both areas was not heavy enough; the yield was estimated at 30 Bu. per acre. The growth of beans was unusually good and all varieties were well filled with seed at the time hogging down began. The variety of corn used was Lancaster Sure Crop.

The 50 pigs used on this test as to breed were as follows:
Berkshire 3, Duroc-Jersey 12, Hampshire 11, Poland China 12, Chester White 12.

The dams of these pigs were fed during the period of gestation a ration of Ear Corn, Middlings, Tankage and Minerals. All of the pigs immediately preceding this test had access to pasture; in fact a large number of these individuals were on a pasture experiment for 78 days in which rape, alfalfa and sudan grass was used. These pigs received a 2-1/2% ration of shelled corn and tankage and minerals. Those not on the pasture experiment had access to rape pasture and were fed a slop mixture of corn meal, middlings, tankage, buttermilk and minerals. The entire group at the beginning of the test was quite uniform as to condition, thrift and vigor.

At the time the hogs were placed on feed, all varieties of beans were in the dough state of maturity except the Illinois 1319 which was slightly less mature having been planted some 5 days later than the others. A self feeder supplied the mineral mixture. In admitting the pigs to the corn and beans, the field was divided lengthwise and entrance made at the section where the Illinois 1319's were located. Naturally the first grazing began here; however, it was soon noted that the pigs were grazing most in the section where the Medium Greens were located and then next in the Manchu's, passing through the Ebony section without eating any noticeable quantity of these beans. When it was necessary to move over to the second half of the field, the cross fence was opened at the opposite end causing the pigs to come first into the Manchu variety; however, they immediately grazed the section of the field in which the Medium Greens were, then next to the Manchu, Illinois 1319 and lastly in the Ebony section. After the field had been completely grazed, there was a considerable quantity of the Ebonies remaining. Several persons from the station were asked to inspect the field during and after grazing to see if they could note any difference at the way in which the pigs were grazing the various varieties, and each observed the general conditions just recounted.

In the check lot tankage and a mineral mixture was supplied in a self feeder to supplement the corn

TABLE

	<u>CORN & TANKAGE</u>		<u>CORN & BEANS</u>
No. pigs		56	56
No. pigs		10	40
Av. Initial Wt.		129 Lbs.	133 Lbs.
" Final "		220 "	207 "
Average Gain		110 "	95 "
Av. Daily Gain		1.964 "	1.696 "
Feed Consumed	Tankage	150.0 "	--
	Corn	110. Bu.	320 Bu.
	Mineral	175.0 Lbs.	400.0 Lbs.

From this table, it is evident that the Corn and Tankage check lot had an advantage .26 pounds on the point of average daily gain.

From the slaughter record, it was found that two of the three check pigs slaughtered at the beginning of the test, killed soft, the third medium hard. The live weight at that time was 134 - 134 and 103 respectively. In the corn and tankage groups, nine of the carcasses graded hard and one medium hard. In the corn and bean groups, 21 carcasses graded hard, 8 medium soft, while one carcass was not graded.

Of the 8 carcasses grading medium soft, two came from the Berkshire, five from Poland-China and 1 from the Duroc-Jersey breed.

The weights and gains of those grading soft may be of interest:

		Initial Wt.	Final Wt.	Gain
Berkshire No.	578	101.3	188.0	86.7
"	" 599	109.3	212.0	102.7
P - C	" 620.3	126.3	228.6	102.0
P - C	" 635	140.6	195.3	54.7
P - C	" 637	148.6	245.3	96.7
P - C	" 639	152.6	243.3	90.7
Duroc J.	" 642	110.0	176.6	76.6
P - C	" 643	135.3	220.0	84.7

The average initial weight for the entire soybean group was 133.0 and the average gain was 95.0 lbs.

It may also be of interest to note that all of the carcasses grading medium soft came from hogs that had been grazed on rape and had received slop feed preceding this test. Of course several individuals grading hard had been handled in the same way, i.e. regarding feed; however, no carcasses graded soft from the alfalfa and sudan grass pasture lots or from the rape when dry feeding had been practiced. These points may have no significance whatever; however, it seemed worthwhile to mention them.

The complete record of all individuals as to gain and slaughter test is here reproduced.

*Quantity put in feeders. Some waste impossible to measure amount.

Mr. Russell: Are there any questions?

Mr. Hankins will now give us a report of the Beltsville experiment.

Mr. Hankins: The plan of the Beltsville experiment was similar to that of the Pennsylvania experiment just reported. There were 2 lots of 20 hogs each which hogged down corn and 4 varieties of soybeans. The 4 varieties of beans were Haberlandt, Morse, Virginia and Wilson. Each lot of hogs had access to the 4 varieties at the same time. In one lot a mineral mixture composed of wood ashes 10 parts, 16% acid phosphate 10 parts and common salt 1 part was self-fed. The hogging-down period in this lot was of 56 days duration, at the expiration of which 19 of the hogs were slaughtered at an average live weight of 189 pounds. The average carcass grading was medium soft, with a grade distribution of 2 hard, 4 medium hard, 3 medium soft, and 10 soft. The average of the refractive indexes was 1.4602.

Due to a slow rate of gain a consequent lack of finish at the close of the 56 day period the other lot was allowed to graze for an additional 22 days during which additional time the hogs were given access to mineral mixture of the same composition as used in the other lot. There was a marked difference in the average rate of gain in the 56-day and 22-day periods. The average total gain made during the 56 day period by the 18 hogs which were slaughtered was 31 pounds while that made by the same hogs during the subsequent 22 day period when mineral mixture was fed was 42 pounds. After the 78 day feeding period 18 of the hogs were slaughtered at an average live weight of 190 pounds with an average carcass grading of medium soft, the same as in the other lot. The grade distribution was 1 hard, 3 medium hard, 6 medium soft and 8 soft. The average refractive index was 1.4606.

It was noticed in this experiment that the hogs ate all varieties of soybeans except the Wilson. When the experiment closed the ground was covered with Wilson beans. After the experiment had closed a group of sows was turned in to clean up the field and several weeks later after all traces of the other rows had disappeared one could still trace those of the Wilson beans by the black beans on the ground. After all other varieties had been cleaned up and the ground rooted up the Wilson beans laid on top of the ground practically undisturbed.

Mr. Russell:

Are there any questions?

We have two more stations to report on this. There is one more test we would like to have reported at this time and that was a carload of hogs fed at the North Carolina Station at their Edgecombe Farm. These hogs were shipped to Richmond, Virginia and slaughtered there. Mr. Hostetler advised us of the fact and we arranged with Mr. Hankins and Dr. Walter to go down to Richmond and the hogs were graded down there.

We will now hear from Mr. Hostetler on this experiment.

Mr. Hostetler:

In Eastern North Carolina there are large areas of arable land that are well adapted to the growing of both corn and soybeans, and since the Upper Coastal Plain Test farm is situated in this section, it has been the plan of those in authority to follow the practice of hogging off these crops rather than to harvest them and sell the grain as a money crop. During the past season the work was begun on November 24, 1925 and closed on February 26, 1926. The following Table I, shows in detail the results obtained:

TABLE I

Lot No. 2
Days on feed - 94
No. of pigs - 67
 Corn and soybeans
Ration - Fish meal, mineral, shorts.
No. of acres used - 14.5
Average
initial weight - 40.6#
Average
final weight - 145.3#
Total gain - 7020#
Average daily gain - 1.12#
Feed per cwt. gain - 400#
Corn and beans 367# or .207 acres
Fish meal - 26#
Mineral - 1.7#
Shorts - 5.7#
Cost per cwt. gain - \$4.32
Pounds per acre - 484#
Supplements per acre - 160#
Cost of crops per acre - \$16.00
Cost of supplements per acre - \$4.93
Net value per acre - \$42.00
Value per bushel of corn - \$1.34

In summarizing the data in Table I, accurate cost records were kept on production of the crops, the protein supplements were charged at their actual cost and the value placed on the hogs was that received when they were marketed less \$1.25 per cwt. for marketing. The prices and values are as follows:

- | | |
|---------------------------------------------------|------------------|
| 1. Production of crop (labor, seed, fertilizer) (| \$16.00 per acre |
| 2. Fish meal | 68.30 per ton |
| 3. Mineral | 20.00 per ton |
| 4. Shorts | 43.40 per ton |
| 5. Value of pork | 13.00 per cwt. |

It will be noticed in the above table that the pigs used in this trial weighed only forty pounds at the beginning of the experiment and for this reason wheat shorts was added to the ration for the first thirty days or until the pigs had attained an average weight of approximately sixty-five pounds.

The yield of corn and soybeans was estimated in the field before the pigs were turned in and these estimates were used in summarizing the data in Table I.

The Corn, which was the "Latham's double" variety, was estimated at 26.4 bushels per acre, while the soybeans, the Mammoth Yellow variety, were estimated at five bushels per acre.

The mineral used was composed of ten pounds of ground limestone, ten pounds of acid phosphate and two pounds of salt. This mixture was kept in a self-feeder so that the pigs had access to it at all times.

At the close of this test the pigs were shipped to Richmond, Va., and sold, Kingan and Company of that city buying 44 head of the larger ones, these were graded by the official committee, with Mr. Hankins, substituting for Mr. Smith, with the following results:

24 hogs were graded hard

13 hogs were graded medium hard

4 hogs were graded medium soft

3 hogs were graded soft

Mr. Robinson, the representative of Kingan and Company, had previously graded these 44 hogs and said that there were six head that were soft, but since the others were satisfactory, he would make no "dockage" on account of these six, we were therefore paid the full market price of 14 1/2 cents for the entire lot of 44 head.

Mr. Russell: Are there any questions?

You can see from these reports that we went through this list of experiments pretty well by stations. We will now hear from Mr. Templeton of the Mississippi Station.

Mr. Templeton:

This report will be very brief. In the hogging-down of soybeans and corn we were to consider three lots of three varieties of beans, the Mammoth Yellow, Larado and Ootootan. The corn and beans were planted but the beans have not come up yet. We had a very severe drouth. There was nothing with which to start the experiment.

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Mr. Russell:

Mr. Hankins has a summary of this work.

Mr. Hankins: I have made up this table to help you to visualize the results which have been obtained in hogging-down corn and soybeans.

Averages by Grades

Grades	No. hogs.	% hogs	In.Wt.	Total Gain	Final Wt.	R. I. Back fat
Hard	100	36.90	120.60	91.68	212.28	1.4595
Medium hard	72	26.57	116.17	84.96	201.13	1.4598
Medium soft	48	17.71	112.92	76.96	189.88	1.4603
Soft	51	18.82	103.02	67.59	170.61	1.4606

Averages by Experiments

No. hogs	Grade-	Ref. Index	In.Wt.	Total gain	Slaughter Weight
3	H	1.4593	103	30	128
16	H	1.4596	-	-	-
4	M-H	1.4596	97	29	126
36	"	1.4596	112	100	202
20	"	1.4597	112	99	197
45	"	1.4597	106	79	176
15	"	1.4597	122	93	204
39	"	1.4598	133	95	207
2	"	1.4598	118	23	149
4	"	1.4599	106	56	150
6	H	1.4600	151	35	179
4	M-H	1.4601	-	-	150
10	M-S	1.4602	73	93	163
3	"	1.4603	117	72	177
6	"	1.4603	82	42	131
37	"	1.4604	127	72	190
6	"	1.4604	124	83	191
20	S	1.4607	116	77	191
5	S	1.4616	-	-	-

[illegible]

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1. *Phragmites australis* (Cav.) Trin. ex Steud.

Mr. Russell: Are there any questions?

Mr. Vestal: Do you include all the hogs that have been slaughtered in the hogging-off experiments in these figures?

Mr. Hankins:

Yes, in the lower table.

Mr. Robison: I might say that the Ohio station ran a test where they put a number of varieties of soybeans before some lambs to see which one they would take first. There did seem to be some correlation between oil content and palatability.

Mr. Russell:

There is one little matter I would like to clear up. Mr. Hankins explained that we had some trouble at Beltsville. At all of our stations we are carrying on quite an extensive test of immunizing suckling pigs. These pigs are immunized when they are suckling their dams, all the way from one day to ten weeks of age. Some 3, 4, 5 or 7 months later these same pigs are injected with hog cholera virus in whatever lot they may be. We had a break for the first time and the only time in five years. The break is not explainable. Dr. Dorset reported it at the Sanitary Association Meeting and the only reason we have for thinking we know something about it is that it was probably weak virus at the time of immunization. That explains the reason for the hog cholera break at Beltsville.

I think it is advisable to bring this session to a close. I am going to ask you gentlemen sometime tonight or whenever you can to look over the manuscript of this second bulletin and be prepared sometime tomorrow to discuss it. We want to get it out within the next two years or sooner. We are hoping to finish our work by Thursday noon. I believe we can do it and still give consideration to everything as it comes up.

We will now adjourn until tomorrow morning at 9:30.

Wednesday Morning

Mr. Russell: We will now come to order. Yesterday we finished the reports on peanut work or practically so. There are two or three yet to come. We have some more soybean work and we will take it up next. This is self-fed, dry lot, free choice with some supplements and the first one is from the Indiana Station. Mr. Vestal will now give us a report from the Indiana Station.

Mr. Vestal:

Experiment II

In the summer of 1927 six lots of spring pigs were fattened in dry lot to study the effect of different proportions of soybeans and corn on the fat produced. Also to compare the effect of different proportions of these feeds on the rate of gain in the hogs. Pigs averaging approximately 63 pounds were used in this experiment. They were started on feed July 1 and were fed for a period of 105 days. Ten hogs were fed in each lot. The lots and rations were as follows:

- Lot 1. Ground corn 36 parts, tankage 3 parts, mixed by weight and self fed free choice with mineral mixture
- Lot 2. Ground corn 36 parts, ground soybeans 3 parts, mixed by weight and self fed free choice with mineral mixture.
- Lot 3. Ground corn 36 parts, ground soybeans 4 parts, mixed by weight and self fed free choice with mineral mixture.
- Lot 4. Ground corn 36 parts, ground soybeans 6 parts, mixed by weight and self fed free choice with mineral mixture.
- Lot 5. Ground corn 36 parts, ground soybeans 12 parts, mixed by weight and self fed free choice with mineral mixture.
- Lot 6. Ground corn 36 parts, ground soybeans 3 parts, tankage 1 part, mixed by weight and self fed free choice with mineral mixture.

All lots had access to pressed block salt.

The mineral mixture was composed of 10 parts wood ashes, 10 parts 16% acid phosphate, 1 part common salt by weight.

Manchu variety of soybeans was used.

Following the feeding period 9 hogs from Lot 1, 9 hogs from Lot 2, lot 3, 9 hogs from Lot 4, 9 hogs from Lot 5, 8 hogs from Lot 6 were shipped to the Beltsville Station for slaughter and carcass tests.

The hogs fed tankage and corn - 1 to 12 - made an average daily gain of 1.61 pounds to the hog. The committee grading was 7 hard, 2 medium hard. The refractive index figures show 8 hard and 1 medium hard.

The hogs fed soybeans and corn 1 to 12 - made an average daily gain of 1.03 pounds to the hog. The committee grading was 2 medium hard, 5 medium soft and 2 soft. The refractive index figures showed 4 medium hard, 4 medium soft and 1 soft.

The hogs fed soybeans and corn - 1 to 9 - made an average daily gain of 1.12 pounds to the hog. The committee grading was 1 hard, 3 medium hard,

2 medium soft and 2 soft. The refractive index figures showed 2 medium hard, 2 medium soft and 4 soft.

The hogs fed soybeans and corn - 1 to 6 - made an average daily gain of 1.04 pounds to the hog. The committee grading was 2 medium hard and 7 soft. The refractive index figures showed 1 medium hard, 1 medium soft, 6 soft and 1 soft and oily.

The hogs fed soybeans and corn - 1 to 3 made an average daily gain of 1.25 pounds to the hog. The committee grading was all hogs soft. The refractive index figures showed 4 soft and 5 soft and oily.

The hogs fed soybeans and corn - 1 to 12 - with $1/3$ of a pound of tankage added for each pound of soybeans made an average daily gain of 1.09 pounds to the hog. The committee grading was 2 hard, 2 medium hard, 3 medium soft and 1 soft. The refractive index figures showed 5 hard, 2 medium soft and 1 soft.

The check pigs used for Experiment I also served for Experiment II, as the hogs used in these experiments were selected from the same drove.

Experiment III

In the fall of 1925 six lots of heavy hogs were fattened in dry lot to study the effect of different proportions of soybeans and corn on the fat produced. Also to compare the effect of different proportions of these feeds on the rate of gain in the hogs. Well grown feeder hogs averaging approximately 132 pounds were used in this experiment. They were started on feed November 21 and were fed for a period of 70 days. Eight hogs were fed in each lot. The rations and lots were as follows:

- Lot 1. Ground corn 36 parts, tankage 3 parts, mixed by weight and self fed free choice with mineral mixture.
- Lot 2. Ground corn 36 parts, ground soybeans 3 parts, mixed by weight and self fed free choice with mineral mixture.
- Lot 3. Ground corn 36 parts, ground soybeans 4 parts, mixed by weight and self fed free choice with mineral mixture.
- Lot 4. Ground corn 36 parts, ground soybeans 6 parts, mixed by weight and self fed free choice with mineral mixture.
- Lot 5. Ground corn 36 parts, ground soybeans 12 parts, mixed by weight and self fed free choice with mineral mixture.
- Lot 6. Ground corn 36 parts, ground soybeans 3 parts, tankage 1 part, mixed by weight and self fed free choice with mineral mixture.

THE HISTORY OF THE UNITED STATES OF AMERICA

FROM THE FIRST SETTLEMENTS TO THE PRESENT TIME

BY JAMES M. SMITH

VOLUME I

NEW YORK

1850

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THE HISTORY OF THE UNITED STATES OF AMERICA

All lots had access to pressed block salt.

The mineral mixture was composed of 10 parts wood ashes, 10 parts 16% acid phosphate and 1 part common salt by weight.

Manchu variety of soybeans was used.

Following the feeding period 8 hogs from Lot 1, 8 hogs from Lot 2, 8 hogs from Lot 3, 6 hogs from Lot 4, 8 hogs from Lot 5 and 7 hogs from Lot 6 were shipped to the Beltsville Station for slaughter and carcass tests.

The hogs fed tankage and corn - 1 to 12 - made an average daily gain of 1.69. The committee grading was 7 hard and 1 medium soft. The refractive index figures showed 4 hard and 4 medium hard.

The hogs which were fed soybeans and corn - 1 to 12 - made an average daily gain of 1.58 pounds to the hog. The committee grading was 1 hard, 4 medium hard, 2 medium soft and 1 soft. The refractive index figures showed 5 hard, 2 medium soft and 1 soft.

The hogs fed soybeans and corn - 1 to 9 - made an average daily gain of 1.46 pounds to the hog. The committee grading was 3 medium hard, 2 medium soft and 3 soft. The refractive index figures showed 2 medium hard, 2 medium soft and 4 soft.

The hogs fed soybeans and corn - 1 to 6 - made an average daily gain of 1.63 pounds to the hog. The committee grading was 2 medium hard, 3 medium soft and 1 soft. The refractive index figures showed 3 medium soft and 3 soft.

The hogs fed soybeans and corn - 1 to 7 - made an average daily gain of 1.46 pounds to the hog. The committee grading was all hogs soft. The refractive index figures showed all hogs soft.

The hogs fed soybeans and corn - 1 to 12 - with 1/3 of a pound of tankage added to each pound of beans, made an average daily gain of 1.63 pounds to the hog. The committee grading was 6 medium hard and 1 soft. The refractive index figures showed 4 medium hard, 2 medium soft and 1 soft.

The committee grading showed check pigs to be 2 soft and 1 medium soft. The refractive index figures showed 2 medium hard and 1 soft.

THE HISTORY OF THE UNITED STATES

The history of the United States is a story of growth and change. It begins with the first settlers who came to the New World in search of a better life. They found a land of opportunity, but also a land of challenges. The early years were marked by conflict and struggle, but the spirit of the American people was one of resilience and determination.

As the years passed, the United States grew in size and power. It became a nation of immigrants, each bringing their own traditions and customs. The American dream became a reality for many, as they sought to build a better life for themselves and their families.

The American Revolution was a turning point in the nation's history. It was a time of great sacrifice and heroism, as the colonists fought for their freedom from British rule. The result was the birth of a new nation, one that was founded on the principles of liberty and justice for all.

The years following the Revolution were a time of rapid growth and expansion. The United States became a world power, and its influence was felt across the globe. The nation's economy flourished, and its culture became a source of pride and inspiration for many.

The American Civil War was a dark chapter in the nation's history. It was a time of great suffering and loss, as the country was torn apart by the issue of slavery. The war ended in 1865, but the scars it left behind were deep and lasting.

The years following the Civil War were a time of reconstruction and rebuilding. The United States emerged from the war as a stronger and more unified nation. The economy continued to grow, and the country's influence in the world became even more pronounced.

The American Revolution of 1892 was a time of great change and innovation. It was a time when the United States became a world leader in many fields, including science, technology, and industry. The nation's growth was unprecedented, and its future seemed bright.

The American Revolution of 1892 was a time of great change and innovation. It was a time when the United States became a world leader in many fields, including science, technology, and industry. The nation's growth was unprecedented, and its future seemed bright.

Experiment I

During the summer of 1925 four lots of hogs were fed to compare soybeans and tankage as supplements to corn for fattening hogs on clover pasture. Also to compare soybeans with and without mineral additions as supplements to corn in fattening rations. Spring pigs averaging 63 pounds were used in this experiment. They were started on feed June 25 and each lot finished in the feeding trial when it had made an average gain of 156 pounds to the hog. Ten hogs were fed in each lot. The lots and rations were as follows:

Lot 7. Shelled corn self fed on clover pasture for 104 days.

Lot 9. Shelled corn, ground soybeans self fed free choice on clover pasture for 104 days.

Lot 10. Shelled corn, ground soybeans and mineral mixture self fed free choice on clover pasture for 99 days.

Lot 11. Shelled corn and tankage self fed free choice on clover pasture for 83 days.

All lots had access to pressed block salt.

The mineral mixture was composed of 10 parts wood ashes, 10 parts 16% acid phosphate and 1 part common salt by weight.

Manchu variety of soybeans was used.

Following the feeding period seven hogs from Lot 7, eight hogs from Lot 9, eight hogs from Lot 10, and seven hogs from Lot 11 were shipped to the Beltsville Station for slaughter and carcass tests.

The hogs which had corn alone on clover pasture, made an average daily gain of 1.5 pounds per hog. The committee grading was 5 hard, 1 medium hard, and 1 medium soft. The refractive index figures showed 6 hard, 1 medium hard.

The hogs fed corn and soybeans on clover pasture ate 1 pound of soybeans to 8.7 pounds of corn and made an average daily gain of 1.51 pounds to the hog. The committee grading was 2 medium hard, 3 medium soft and 3 soft. The refractive index figures showed 1 hard, 3 medium hard, 1 medium soft and 3 soft.

The hogs fed corn, soybeans and mineral on clover pasture ate 1 pound of soybeans to 11.9 pounds of corn and made an average daily gain of 1.59 pounds to the hog. The committee grading was 1 hard, 2 medium hard, 1 medium soft and 4 soft. The refractive index figures showed 3 hard, 2 medium hard, 2 medium soft and 1 soft.

The hogs fed corn and tankage on clover pasture ate 1 pound of tankage to 13.5 pounds of corn and made an average daily gain of 1.91 pounds to the hog. The committee grading was 6 hard, 1 medium hard.

The refractive index figures showed 7 hard.

The committee grading was that the check pigs of this experiment were all soft. The refractive index figures showed 2 medium hard and 1 medium soft.

It will be noted that the committee grading indicated more softness in all lots than was shown by the refractive index figures.

Mr. Russell: Are there any questions?

Mr. Salmon: Did you use the same variety of soybeans as you did last year?

Mr. Vestal yes, we did.

Mr. Robison: Do you have any reason for the difference?

Mr. Vestal: No. I do not. The oil content of the beans fed this year was higher than the year before.

Mr. Russell: Are there any questions?

We have something along the same line from Beltsville, Mr. Hankins will report on that.

Mr. Hankins: I want to explain to you first how we figure the average committee grading on a group of hogs. We take the five grades, hard, medium hard, medium soft, soft and oily, and assign values such as 5 for hard, 4 for medium hard, 3 for medium soft, 2 for soft and 1 for oily. We substitute these values for the gradings on a group of hogs, get a total and figure the average. If the average is 3, or closer to that figure than to 2 or 4, we know that the average grading is medium soft; if closer to 4 than 3 or 5 it is medium hard, etc.

In the Beltsville experiment in which we fed different proportions of corn and soybeans we used pigs having an average initial weight of approximately 100 pounds. There were 4 lots of pigs fed, each lot containing 10 animals. The feed combinations used were as follow: Lot 1, ground corn 12 parts, tankage 1 part; Lot 2, ground corn 12 parts, ground soybeans 1 part; Lot 3, ground corn 9 parts, ground soybeans 1 part; Lot 4, ground corn 6 parts, ground soybeans 1 part. In each case the feeds were mixed and self fed, free choice with mineral mixture which was composed of wood ashes 10 parts, 16 per cent acid phosphate 10 parts and common salt 1 part.

The lots were fed to an average gain of approximately 125 pounds, the purpose in view being to kill at a final experimental weight of about

1. What is the purpose of the document?

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225 pounds. The corn and tankage check lot produced 8 hard hogs and one medium hard hog from the 9 killed, with an average refractive index of 1.4594. The lot fed corn 12 parts with soybeans 1 part produced the following: one hard, 4 medium hard, 4 medium soft and 1 soft. The average grading falls right on the line between medium soft and medium hard. The refractive index was 1.4604.

The 10 hogs in the lot fed 9:1 produced carcasses which were graded as follows: one hard, 3 medium hard, 2 medium soft and 4 soft, with an average grading of medium soft and with an average refractive index of 1.4607. Where the 6:1 was fed there were 1 medium hard, 4 medium soft and 5 soft carcasses produced. These averaged very close to the dividing line of soft and medium soft grades. Their average refractive index was 1.4607.

Mr. Russell:

Have you a summary of these experiments?

Mr. Hankins: I have a summary of three experiments at the Indiana Station and the one at the Beltsville Station just reported. I think you will be interested in the distributions of the gradings in the four groups fed the 3, 6, 9 and 12 to 1 combinations of corn and soybeans. They are as follows:

| | | | | |
|------|--------|----------------|-------------------|----------|
| 3:1 | ..... | 1 medium hard, | 3 medium soft and | 23 soft. |
| 6:1 | 3 hard | 8 " " | 10 " " | 14 " |
| 9:1 | 9 " " | 9 " " | 7 " " | 10 " |
| 12:1 | 8 " " | 10 " " | 13 " " | 5 " |

The following table gives a summary of important data by groups or according to the feed combinations fed.

Averages by groups

| Feed
combination | No. hogs | Sltr. Wt. | Grade | R.I.
Back fat | In. Wt. | Gain |
|---------------------|----------|-----------|-------|------------------|---------|------|
| 3:1 | 27 | 204 | S | 1.4615 | 106 | 114 |
| 6:1 | 35 | 206 | M-S | 1.4607 | 103 | 117 |
| 9:1 | 35 | 209 | M-S | 1.4605 | 105 | 118 |
| 12:1 | 36 | 207 | M-H | 1.4603 | 105 | 116 |

Mr. Russell: These experiments were planned for the purpose of determining the quantity of beans that might be fed in connection with corn. We all know the farmer ordinarily will hog down his beans and corn and the proportion is not known. It seems to me it would be desirable to find where the breaking point comes. The suggestion has come from the Indiana station as I recall it. To me it is very interesting.

With one part of beans and 12 of corn we are getting a few soft hogs. In the 9 to 1 we get a number of soft hogs. In the 3 to 1 they are all soft and in the 6 to 1 we are getting more than 50 per cent soft hogs, which indicates pretty clearly that soybeans do have a very softening effect.

Dr. Jacob: What variety of beans do you use?

Mr. Vestal: The Manchu variety is what we use.

Mr. Russell: At Beltsville we use Virginias.

Dr. Jacob: Is there any difference in the analysis of beans in the different parts of the country?

Mr. Russell: You will recall one statement that Mr. Vestal made that the two different years he carried on these tests there was a 2 per cent difference in the analysis of the same beans. We have an analysis of our beans and will include it in the report of the meeting.

Mr. Hankins: It seems rather clear that with the lower rate of gain we get softer hogs. Of course, oftentimes rate of gain is confused with the factor of finish when other conditions are uniform. We do know there is a direct relation between finish and firmness in feeding corn without softening supplement.

Mr. Vestal:

I would like to call your attention to some of our experiments where we fed corn, soybeans and minerals free choice. This was in 1922 I believe. Where the hogs had corn, soybeans and minerals at the rate of 1 to 10 all the hogs were hard and at the rate of 1 to 8 they were hard. We fed Midwest or Haberlandt beans.

Mr. Robison: What weight were those when they were started?

Mr. Vestal: They weighed 112 pounds. In another experiment in 1924 we used A.K. variety of soybeans.

Mr. Russell: What color were these beans?

Mr. Vestal: They are a yellow bean. These were started at 120 pounds, fed for 60 days. They were also fed corn and mineral free choice. In one case they ate at the rate of 1 to 4, another case 1:6.3. Where they had 1:4.4 we had practically as much hardness as with the 1:12 in our most recent

experiment. All through this second experiment we had considerable softness because of the large amount of beans consumed. So it appears that we have had more softness in the hogs where we fed Manchus than where we fed A. K. or Midwest.

Mr. Robison: Do you think the hogs will eat the Haberlandt better than the Manchu?

Mr. Vestal: We have done very little work with either of these.

Dr. Jacob: Has there been any work done on grazing the soybeans at different stages of its growth, making a comparison in gains and carcass gradings?

Mr. Russell:

I believe the tests in hogging down that we have made have practically always been with mature beans.

Mr. Halverson:

Is that when you turn the hogs in?

Mr. Russell: Yes, it is.

Soybeans are being raised in almost all parts of the country and I can not help but think they should be raised. They are a valuable crop but we do not want to get too enthusiastic about it. Just the last week I had a letter from an extension swine specialist in one of our states in which he said the thing seems to be going over the top, that is the planting of soybeans. Some of the larger farmers were putting in 150 to 200 acres to fatten their hogs on them. You people are not in extension work but you are in contact with extension people to a greater or less extent and I believe our influence should be used along the line of caution until we know more than we do know. The reports of this work indicate the seriousness of conditions. Mr. Vestal just reported where he got a good many hard hogs out of 1:4.3 and we are getting soft hogs with 1:12. It seems to me the country does not want to get into conditions with soybeans that the south did with peanuts. They were producing soft hogs when they thought they were producing hard hogs. The whole soybean question to my notion is worthy of mighty serious thought and you can readily see we have a lot more work to do, but I am just taking this up at this particular time to suggest to you, while we can not say a whole lot because we have not a lot of conclusions, we should be on our guard. If a farmer asks you tell him to go slow about it.

I had an interesting talk with one of the packers. It happened to be Swift & Company's manager at St. Paul, Mr. Bangs. I went through their cooler and they had a dandy bunch of hogs. I think I checked over some 600 or 700 and they were hard. In discussing the matter Mr. Bangs made the statement, "These hogs are hard but they are not as hard as these hogs would have been some 7, 8 or 9 years ago." Naturally I think the packers are blaming soybeans for it to some extent. It is part of the business to try to steer the producer in a channel that he will

produce a hog that is going to be satisfactory to the packers.

Dr. Jacobs: It would be a rather serious thing in our state at this time to come out with a condemnation of soybeans.

Mr. Russell: We do not want to do that. I feel and I think you gentlemen all do, that we have been pretty careful in conclusions that have been published to always urge the use of soybeans. We are trying to work out some scheme whereby the farmer can use soybeans to a greater extent than he does and produce a satisfactory quality of pork. Some of the station men seem to feel we are trying to discourage the use of soybeans.

Mr. Martin: We have something of the same conditions you mention just west of Memphis in Arkansas. Some of the rice growers are going to put in as much as 100 acres. They are going to hog this down with very little of other feeds. They are doing it to clear their land to grow more rice.

Mr. Russell: We can not tell them they can not do it, but you can tell them if they feed their hogs on soybeans they are going to get soft hogs.

Is there any further question on this particular line.

Mr. Templeton: Before you take up anything further and while we are still talking about the matter of what we are going to tell our station people and farmers I have had a little experience the last few weeks that has called my attention to this in a different way. It is very easy for us to see the other fellow's mistake more so than our own. A few weeks ago I ran across the statement in a press article that attracted my attention. At first thought I was much inclined to censure the people for the publication. Then I began to look a little closer and was a little bit concerned to find some statements a little out of line with our agreement. I was a little bit surprised at finding 5 or 6 other stations in the same boat. Our problem in the south is a little different. Our people know we have a soft-pork problem and they are constantly after information. Outside of a few conclusions we have given there has been very little information for the farmer. The farmer feels we have been working on this problem for a long time and naturally he is looking for some results. In this 1924 report I refer to I did take the liberty of giving the carcass gradings of some of our soybean grazing work. I made reference to the fact that it was a cooperative phase of the work but made no attempt to draw any conclusions. Our people are asking this question. They come in and see our hogs in every stage of this soft-pork work. I realize that some of our corn belt stations are not bothered that way. A number of county agents as far as Iowa are writing to us on our soft-pork problems. I wonder if it would not be well to determine at this meeting if possible just what is right about this matter. As far as our station is concerned we have no idea of going beyond our bounds. We simply want to meet our obligations in the right way.

Mr. Russell: This is undoubtedly the question. I do not know but what a statement from our side of it might be in line at this time and what I have in mind is a project agreement we have and it was originally stated in the project agreement that there should be no publication of results concerning the quality of pork produced without the consent of both parties. It was for this reason. I referred to that a moment ago. Those of you gentlemen who are in the south and those who are acquainted with the southern problem know that a few years ago at least and at the present time to some extent a good deal more than it should be, the farmer thinks he can take a hog that is soft and put him in dry lot on hardening feeds and in 3 or 4 weeks make him hard. We have said in statements it can not be done in 3 weeks or at a practical market weight. When this work began we knew that publications had been made. There was no criticisms on publications at that time because when the stations finished a test they published it. We have gotten enough to say that we are getting very much different results from different tests. The only way we draw conclusions is to get a sufficient amount of data to prove something. A clause in the project was inserted to prevent misinformation. I recall taking it up at the first meeting. While the Department has a project agreement with each station on the publication of results of any experiment as far as the quality of pork produced is concerned, we have never agreed to the publication of anything that has not been agreed upon at these various meetings. I hope this explains the attitude of the Department and also the reason for the clause in the project agreement.

Dr. Jacob: Have there been any specific complaints coming from the packers on soybean fed hogs?

I would like to ask Mr. Vestal if you people had any complaints.

Mr. Vestal: We have not had any in the last year. The year before we did.

Mr. Russell: The year before last we did have a complaint, that is it was more in the nature of an inquiry than a direct statement. It was that they were getting a larger percent of soft hogs and they were wondering to what extent soybeans entered into this big run of soft hogs they were getting.

Dr. Jacob: It seems that the thing is very indefinite on both sides. I doubt the wisdom of making any statement about it.

Mr. Ferguson: If it had not been for the fact that the packers were friends of this committee you would have heard a great deal more complaints. We notice that with the increased acreage of soybeans extending the softening tendency increases.

Dr. Jacob: As I said before that is the kind of information the men here should have. If we hear no complaints we infer the hogs are satisfactory.

Mr. Ferguson: I stood up here for three or four years to tell you what we have. We have reached a stage where it is almost impossible to get our products into foreign markets. Lard is the one kick over here. We have changed from the wet system to the dry steam rendering. Nobody has been successful in producing lard for shipment. The import doors are

locked against them. On top of that you get this condition. They have rather a serious problem confronting them. If it is possible in a conservative way to put out a word of advice through this meeting or just merely to accentuate this warning. I think this is a good thing to do. I believe that a good deal of warning has gone out to the public. The producer has reached out for anything and everything that will cut the cost. The soybean is one thing. I have told our people to make the best of this condition until things clear up.

Mr. Vestal: I would like to ask Mr. Ferguson if there have been as many soft hogs received during the past year as there had been in the preceding year.

Mr. Ferguson: I believe we have not had as many soft hogs during the past year. We had fewer complaints than from the year before.

Mr. Robison: Could that be because the hogs are coming in at heavier weights?

Mr. Ferguson: They are fed longer and fed the things that are cheaper.

Mr. Robison: Are the packers inclined to attribute the cause of soft pork to any other factor than soybeans.

Mr. Ferguson: Yes, because we get soft pork at Winnipeg and Toronto, Canada, where soybeans have never been fed to hogs.

Mr. Robison: Has that tendency increased there?

Mr. Russell: That in substance is unfinished carcasses is it not?

Mr. Vestal: Mr. Ferguson have you any figures showing the percent of hogs that are killing soft in that district?

Mr. Ferguson: We have not any count because it is only where individual cases are kept where attention is paid to it. The packer can not, as you understand, check the carcasses that go through for record.

Mr. Salmon: I would like to ask Mr. Ferguson if in his opinion anything can be done on the part of the consumer.

Mr. Ferguson: As I understand it 13 packing houses went broke doing that same thing.

Mr. Templeton: Is that altogether a question of soft pork or is it because the packer went in on high tide and had to get out at low tide?

Mr. Ferguson: No, I think it was the fact that they could not get wide distribution of their goods at the right price. You have your high price cotton which is a big factor. I want to give you a note of encouragement. Swift & Company at Moultrie have decided that there is no use bucking natural conditions. They are now curing Virginia style hams. We have

various products of sausage and other products which fit in with their products. We are making headway in that line. We have decided there is no use bucking nature and we are taking things as they come.

Mr. Salmon: In our state we have no surplus. We have to ship from outside.

Mr. Ferguson: In central Georgia the people do not want to eat the stuff from their own farms. They have money and are doing selective buying.

Mr. Salmon: I have been getting some products from Mr. McDowell and making some tests on them. I am referring to flavor.

Mr. Ferguson: When it comes to getting it to the table it will not stand up in the market.

Mr. Salmon: When you fry the bacon you have a more practical piece of meat from the soft than from the hard.

Mr. Ferguson: This is probably getting into the economic side of this thing. Mr. Russell and I talked about it in the lobby this morning. If the future means soft and oily hogs and hog products over a widely distributed area surely then you are wasting your time.

Mr. Salmon: I just think we started at the wrong end. I think we should have ascertained whether there was a grievance toward it on the part of the consumer.

Mr. Ferguson: I think the answer is seen in the fact that he refuses to buy the product. It is a question of difficulty in handling the product and putting it up in an attractive form with good appearance. That is the physical side. When the consumer has been buying well finished attractive products they will not take this product because in the minds of experienced buyers that means a difference in quality. It means refrigeration has not been maintained along the line and the product has been allowed to suffer. They turn away from that product and go over to the attractive product. In those areas where you could offer these products to the uneducated people I think you could do business. When we shipped these cans of lard, hams, and dry salt pork to Boston and Eastern markets we were left with the stuff on our hands. In one case we had to tank a whole car of stuff because the people of Boston would not eat that kind of product. By the time you get your consumers over to the place where they meet the conditions you would be broke.

Mr. Vestal: One of the bright spots is that in the corn belt states most of the farmers feed the beans in the corn field and there is where we have the least trouble with soft pork.

Mr. Ferguson: You recall that two years ago I offered the suggestion that some of your experimentors could work with your agronomists to get out a bean low in fat and high in protein.

Mr. Russell: I will just say that we talked it over with our soybean man and he said it was a fine piece of work and he saw no reason why it should not be taken up. He said "how about the oil meal people" and I replied that I could see no reason why a bean having a high fat content could not be developed for the mill man.

Mr. Salmon: Last year I mentioned that our agronomist but for some reason he did not get started on it.

I would like to offer this resolution since the production of soft pork is definitely related to the fat content of the ration. While soybeans are a good protein supplement their high content of oil results in the production of soft pork when they are fed in large quantities to hogs. Therefore, be it resolved by this conference (1) that the urgent need for strains of soybeans with a high protein and low oil content be emphasized, (2) that this resolution be referred to the agronomists of the Department of Agriculture and of the various State experiment stations with the request that they attack the problem of producing such strains as soon as possible.

Mr. Russell: Motion made and seconded that this resolution be adopted.

Mr. Robison: Back about 1916 I suggested the same thing to our agronomist at the Ohio Station. They may have done something but not much. They have found considerable variation in the oil content as well as protein content.

Mr. Russell: I do not know anything about agronomy. I do not see why they could not get their heads together in a cooperative way.

Mr. Edwards: I believe one of the stations in the middle west has done some work for breeding for high oil content.

Mr. Salmon: In view of the results that Illinois has gotten with corn I think it is a good undertaking.

Mr. Russell: It is not impossible at all and I do believe if the agronomists would consult with each other and get together more comparable work could be carried on.

Mr. Robison: I do not think they have ever realized the importance of it.

Mr. Russell: We will get a copy of this resolution made when we get back home and forward it to each one of you gentlemen in the respective stations and you hand it over to your agronomy people.

Mr. Edwards: I was talking to the agronomist at the Georgia station sometime ago and he was saying that he thought something could be done along this line. He thought they would do some work on it.

Mr. Salmon: Our agronomist is interested in the project and he hoped to make it a real project. I do not think they have started any real work yet.

Mr. Russell: Are there any questions?

Mr. Templeton: I would like to call the attention of the meeting back to the publicity matter.

Mr. Russell: I realized that fact that we were straying away from the subject under consideration but I thought it was time well spent.

Mr. Durant: In South Carolina the station men and county agents want publicity on soybeans. We intend to put out a bulletin on the feeding value.

Mr. Russell: There is one matter that I hope is clearly understood that in no case has there been any objection on our part to the publishing of feeding results.

Mr. Durant: We have that bulletin practically completed and our idea was to make the statement that soft pork work was being conducted but not give any results at all.

Mr. Russell: I think it would be well to mention a report that was made by the Pennsylvania Station in which was reported the results of the gradings in a test they made. I think the first we noticed it was a letter from one of our cooperating states calling attention to that publication. Our attention was called to it and we looked up the publication and it was in direct contrast with the agreement. We wrote to them about it and they came back and said it was a fact and an oversight on their part. I saw Mr. Grimes since and he said he never thought of it at all. I am mentioning this to give you the attitude of the Pennsylvania Station.

Mr. Edwards: I do not believe there would be any trouble if all the stations would confine themselves to the statement given out as regards quality of pork.

Dr. Jacob: Suppose your extension men come to you and ask you what shall be our attitude from now on and what are you going to tell them.

Mr. Russell: Tell them to be careful. That is one trouble with a lot of us, we just hate to tell what we do not know.

Mr. Robison: In our state we do not have any trouble with our extension men but the agronomists do boost soybeans. That is where we get into trouble.

Mr. Russell: We can not control the extension fellow or the agronomist. I took that up with our own Department extension and agronomy men, but came to no definite understanding.

Mr. Salmon: In Alabama I doubt if we would do much harm in advocating the use of soybeans. In all cases we recommend the use of soybeans and corn planted together. I do not believe we are making any softer hogs with corn and soybeans than with peanuts. The yield of soybeans is much larger than the corn.

Mr. Vestal: We have had 5 to 6 bushels of beans and 40 to 50 bushels of corn.

Mr. Robison: I do not recall but it depends on the rate of seeding soybeans and corn. The highest yield comes with a medium seeding of corn. The total yield of corn and beans when these proportions are used, the beans will run 4 to 10 bushels and the corn from 35 to 50 bushels, 7 parts of corn and 1 part beans.

Mr. Salmon: I hope you will not misunderstand the statement I made. I think the proportions of soybeans to corn is more than in the corn belt. When we plant soybeans with corn we get 4 to 5 bushels of soybeans and 10 to 15 bushels of corn to the acre.

Mr. Templeton: I think we have another trouble in the south as far as Mississippi is concerned, perhaps a little more so than Alabama, when you figure the corn. We will have to go heavier in soybean feeding to produce pork for our own consumption and save the corn for other purposes. We are paying 96¢ a bushel for corn. When you figure that back I doubt very much the recommendation of hogging-down corn and soybeans until we know more about it. I believe with the higher yield of soybeans at least it looks favorable at this time to feed back a minimum amount of corn ration than to hog down the combined crops, but the indications are in favor of the maximum use of soybeans and the minimum use of corn.

Mr. Salmon: The main reason we are making the recommendation of hogging-down is labor. We are needing to do everything possible to economize on the labor question.

Mr. Russell: I will tell you what I would do. This question was brought up in Maryland. I said we are doing work on it but we have no conclusions. We do not know. I say go ahead and hog down your corn. I do not see any objections to tell them that. I said a bit ago the easiest way is to tell them you do not know.

Mr. Hostetler: I was just going to say that is true, but the authorities at some of the southern stations who produce the money for this work want to know.

Mr. Russell: I hear that all the time. I do not believe it is true to a great extent.

Mr. Hostetler: I will convince you.

Mr. Russell: Let me explain. There is no man in the U. S. Senate who has taken more interest in the soft-pork problem than Senator Harris. Either Senator Harris or his secretary called up one or twice a year wanting to know about soft pork. He did not get very much and he did not like it. I think it was a year ago after the adjournment of Congress he called me over the phone and said he did not like the answers he was getting over the phone. I explained to him why we could not give out any information until we were positive about it and had proof for our statements. After my explanation he clearly saw just why we were not giving out promiscuous statements. Then he was perfectly satisfied.

Mr. Ferguson: Would it be possible and reasonable for your extension service cooperating with a number of stations to put out a very brief bulletin, summarizing 1, 2, 3, the things you have determined and agreed upon in this work, and major questions these men all want to know about. We have quite a number of inquiries from farmers and livestock men who want to find out what we know. We refer them to the Federal Department or to the Stations. They are not satisfied with the answers they get.

I spent yesterday afternoon going over Department Bulletin 1407, your new bulletin. The average farmer has not the time to get the things out of this bulletin that he should get. Can not you get out a statement that could be read in five minutes time?

Mr. Russell:

After six years of investigations we have finally gotten out a bulletin. We have a second one now in manuscript form which we hope to get out sometime. We are getting to the place now where we have carried on a lot of preliminary work which was necessary and which did not prove very much but we are getting away from that and one item in our expense accounts this year namely the amount of money we had to expend for express and freight shipments shows this quite clearly. I think we will get through at the end of this year with less money than any year since the beginning of the investigations, due to the fact that we are not shipping in by express except in a few cases. They are coming in in larger numbers. We are killing in larger numbers and getting our results much more rapidly. We are getting to the point where we are going to be able to give out facts a great deal more rapidly than heretofore.

Getting down to this publication of the stations and the project agreement it does not seem to want to be discussed very much. I know what the attitude of the Department is going to be. It is going to comply with the agreement and that is all. If these men who are engaged in the work want to take it up and have it changed then new projects will be made and signed but we will necessarily insist that everyone comply with the signed agreement.

Is there anything further along this line? If not, we will go on to the further reports of our experimental work. Mr. Templeton you brought this matter up. Is it satisfactory?

Mr. Templeton:

I believe that there are two or three men in this group who are in the same group I mentioned a while ago. As far as our station is concerned I made up my mind what I was going to do. I wanted to get the expression of the men from several of the stations. I agree with you that if we had an agreement we should abide by it. If it is out of date let us bring it up to date and then abide by it.

Mr. Salmon: Personally I am in favor of the agreement standing just as it is. The first year I was doing this work I reported the slaughter data to the director in making my annual report and noted it was confidential. I do not

believe it would do any harm as far as the farmers are concerned but where some agricultural writer gets ahold of our data and draws his own conclusions that is where the trouble comes. I now make a note that it can not be published except by the agreement of the State experiment stations, etc.

Mr. Russell: I want to make one matter very clear. In no case where publication has been made by the station whose representatives have been at these meetings does the Department think that the men attending these meetings have been to blame. I want you gentlemen to understand that we do not believe that you have been trying to put anything over on us.

Mr. Hostetler: I suppose we have erred as bad as anybody else, probably worse, but I really think for the best interests of the whole work it would be better to stick to this agreement and confine our publications to the results of our findings here or at least the findings that have been agreed on by this body rather than to make mistakes or possible erroneous statements offhand. As far as we are concerned I think that we would be agreeable to the agreement as it stands.

Mr. Russell: I presume the different stations have different forms of these reports. Possibly some of you gentlemen are compelled to report the whole results of your work to the director. Would not it be possible to do as Mr. Salmon said? Say it is confidential.

Mr. Hostetler: I might say that I came here with somewhat the same feeling that Mr. Templeton had in looking over the reports. After this matter came up I collected all the annual reports as far as possible and I find that practically all of the southern states have sinned to a greater or less extent.

Mr. Templeton: It seems to me that with this publication ready for distribution that the present need for information is going to be somewhat less. It occurred to me that probably the first thing for us to do is to be very careful from now on with information given to directors in regard to our soft-pork work.

Mr. Russell: Is that the consensus of the meeting? If there is no question we will leave it that way.

A year ago this summer the Ohio Station had a bunch of hogs that were fed with certain quantities of soybean oil meal. That was the initial shipment of the Ohio station to Beltsville. This is the first meeting Mr. Robison has attended since that time. I am going to ask him to give us the results of that work.

Mr. Robison:

I might say how we happened to be using soybean oil meal. Back in 1917 and 1918 we ran a number of experiment comparing different supplemental feeds for feeding with corn. Soybean oil meal was one of the feeds used in that work. We got very good results with that and later on we found by using minerals we got better results than with tankage.

During the winter of 1924 - 1925 an experiment was carried on at the Ohio Station to compare different minerals, particularly carriers of phosphorus, for feeding with a ration of corn and soybean oilmeal. The pigs used were purebred Duroc Jerseys from the Station herd which averaged approximately 44 pounds each at the beginning of the test and which were carried, when possible to a final weight of approximately 200 pounds. Until an average weight of 100 pounds was reached 14 parts of soybean oilmeal to 83.5 parts of ground corn, by weight, were fed. After a weight of 100 pounds was reached the proportions were changed to soybean oilmeal, 12; corn, 85.5. With the exception of Lot 1 which was given a half a pound of salt in each 100 pounds of total feed, the minerals fed amounted to 2.5 per cent of the total ration. The feeds and minerals were mixed together and self fed. In addition to the flake salt used in the mineral mixtures each lot had access to block salt.

Throughout the experiment the pigs were confined in a hog barn in 10 by 12-foot pens, floored with concrete and having wooden slats for beds. Thus, they had no access to soil or to green feed of any kind and were practically without exposure to direct sunlight.

Table I gives the mixtures compared and shows the results secured. (Table I)

By March 17 or 13 weeks after the beginning of the experiment six pigs out of the eight in Lot 1 were suffering from stiffness or lameness as a result of having received a ration deficient in minerals. Two were in such bad shape as to necessitate their removal. A little later three pigs, including one each from Lots 1, 7, and 10 were removed for slaughter and pathological examination. On March 24 three per cent of alfalfa meal, an amount thought sufficient to keep them alive but not to cure them, was added to the ration for Lot 1, for the purpose of carrying them until Livestock Day, May 29. The five remaining pigs were alive at the close of the test but two of these died on May 29 from being moved. An examination of these showed that the femurs had been fractured and revealed a very soft porous condition of the bone.

Under the conditions of the experiment and with pigs of the age used ground limestone alone, added to the corn, soybean oilmeal and salt, failed to maintain the thrift of the animals. The pigs remained in good condition a little longer than those in Lot 1 but by March 24 it was deemed advisable to include 3 per cent of alfalfa meal in their ration as well. For the first 13 weeks they made an average gain of .72 pound daily and consumed only 351 pounds of feed for each 100 pounds of gain, or only 3.3 per cent more than was taken by the pigs of Lot 3 to the same approximate weight. By the close of the experiment their feed consumption per unit of gain was 20.2 per cent greater than that for Lot 3.

Acid phosphate and ground rock phosphate in addition to the ground limestone kept the pigs in a healthy condition longer than did the limestone alone but by the end of the eighteenth week 6 of the pigs getting acid phosphate and four getting ground rock phosphate showed symptoms of rickets. Accordingly 3 per cent of alfalfa meal was included in their rations after April 28.

Toward the close of the experiment it occurred to us that the Bureau of Animal Industry might possibly be interested in slaughtering some hogs that had been fed soybean oilmeal and testing and grading the carcasses in connection with their soft pork investigations. The matter was taken up with Mr. Russell and subsequently arrangements were made to ship these hogs and another lot which had received a ration of corn, soybean oilmeal, linseed meal, alfalfa meal, ground limestone and 16 per cent acid phosphate to Beltsville for slaughter.

Two of the pigs left in Lot 1 weighed 98 pounds and the other one 119 pounds. Although their refractive index grading was hard, all three of them were graded soft by the committee.

One of the pigs in Lot 2, the limestone lot, graded hard, two medium hard, two weighing 131 and 154 pounds, respectively, medium soft and one, weighing 85 pounds, soft.

With the exception of two pigs weighing 117 and 159 pounds which were medium soft, all of the pigs in Lot 3, getting salt, limestone and bone meal, graded hard.

The carcass of one pig in Lot 4, getting salt, limestone and spent bone black, was medium soft, two were medium hard and four hard.

Four of the pigs in Lot 5, which had received salt, limestone and treble superphosphate, graded hard and 3 medium hard.

The six pigs left in Lot 6, which had been given a mineral mixture of salt, ground limestone and acid phosphate, were all graded as hard.

Those of Lot 7, given ground rock phosphate with the salt and limestone, graded 2 hard, 2 medium hard and 1 medium soft.

All of the pigs of Lot 8, fed the mineral mixture of salt, limestone, raw bone meal, and ashes graded as hard.

Four pigs from Lot 9, which had received salt, limestone, raw bone meal, ashes and cooperas as a mineral mixture, were shipped. The carcasses of three of these were hard and one medium hard.

The pigs of Lot 10 were fed minerals composed of salt, ashes and acid phosphate. Three of these graded soft. They weighed 99, 139 and 166 pounds, respectively. One weighing 197 pounds graded medium soft. A 108 pound pig graded medium hard and a 175 pound one hard. The refractive index grading on all of these was hard.

The lot, which was fed corn, soybean oilmeal, linseed oilmeal, alfalfa meal, ground limestone and acid phosphate as mentioned above, contained 9 pigs. The carcasses of 8 of these were hard and that of 1 medium hard.

As judged from the refractive index, which, with the one exception of an 85 pound pig in Lot II having an index number of 1.4599, ranged from 1.4595 to 1.4583, all of the pigs in the shipment killed out hard.

TABLE I

MINERALS FOR FEEDING WITH CORN AND SOYBEAN OILMEAL
Dry Lot Experiment Started Dec. 16, 1924 (Eight Pigs Per Lot)

| Supplement to corn | Soybean Oilmeal | | | | | |
|-----------------------------------|-----------------|-----------------------------------------|---------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| Mineral mixture* | Salt | Salt, 2;
ground
lime-
stone, 8 | Salt, 2;
ground
lime-
stone,
4; raw
bone-
meal, 4 | Salt, 2;
ground
lime-
stone, 4;
bone
black, 4 | Salt, 2;
ground
lime-
stone, 4;
treble
super-
phos-
phate, 4 | Salt, 2;
ground
lime-
stone, 4;
acid
phos-
phate 16
percent, 4 |
| Initial weight per pig..... | 43.9 | 44.4 | 44.2 | 44.3 | 43.9 | 44.1 |
| Average daily gain..... | .49 | .58*** | 1.19 | 1.02 | 1.08 | 1.01 |
| Days required to reach 200 lb.... | 321 | 269 | 131 | 153 | 144 | 154 |
| Daily feed per pig: | | | | | | |
| Corn..... | 2.21 | 2.07 | 3.59 | 3.22 | 3.46 | 3.60 |
| Soybean oilmeal or tankage..... | .35 | .32 | .54 | .49 | .52 | .53 |
| Mineral mixture..... | .01 | .06 | .11 | .10 | .10 | .11 |
| Alfalfa meal**..... | .02 | .02 | ..... | ..... | ..... | .02 |
| Block salt #..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Total | 2.59 | 2.47 | 4.24 | 3.81 | 4.08 | 4.26 |
| Feed required per 100 lbs. gain: | | | | | | |
| Corn | 453.6 | 357.8 | 301.5 | 317.0 | 319.2 | 354.8 |
| Soybean oilmeal or tankage..... | 71.5 | 55.6 | 45.1 | 48.4 | 47.7 | 52.5 |
| Mineral mixture | 2.7 | 10.7 | 8.9 | 9.4 | 9.4 | 10.5 |
| Alfalfa meal**..... | 3.4 | 3.0 | ..... | ..... | ..... | 2.0 |
| Block salt #..... | .08 | .13 | .04 | .08 | .04 | .03 |
| Total | 531.3 | 427.2 | 355.5 | 374.9 | 376.3 | 419.8 |
| Cost of feed per 100 lbs. gain. | \$11.38 | \$8.98 | \$7.59 | \$7.92 | \$8.01 | \$8.86 |

Lot Number

10

| Supplement to corn | Soybean Oilmeal | | | | | |
|-----------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|--|--|
| | 7 | 8 | 9 | 10 | | |
| Mineral mixture* | Salt, 2;
ground
limestone,
4; ground
rock phos-
phate, 4 | Salt, 2; ground.
limestone, 2;
raw bonemeal,
3; hardwood
ashes, 3 | Salt, 2; ground.
limestone, 1.8;
raw bonemeal,
3; hardwood
ashes, 3; cop-
peras, .7 | Salt, 1; hard-
wood ashes, 10;
acid phos-
phate 16
percent, 10 | | |
| Initial weight per pig..... | 44.2 | 44.3 | 44.2 | 44.3 | | |
| Average daily gain..... | .71 | 1.16 | .98 | .97 | | |
| Days required to reach 200 lb.... | 220 | 135 | 159 | 161 | | |
| Daily feed per pig: | | | | | | |
| Corn..... | 2.69 | 3.47 | 3.44 | 3.42 | | |
| Soybean oilmeal or tankage..... | .41 | .52 | .51 | .51 | | |
| Mineral mixture..... | .08 | .10 | .11 | .10 | | |
| Alfalfa meal**..... | .014 | ..... | ..... | ..... |  |  |
| Block salt #..... | ..... | ..... | ..... | ..... |  |  |
| Total | 3.20 | 4.10 | 4.06 | 4.03 | | |
| Feed required per 100 lbs. gain: | | | | | | |
| Corn..... | 379.3 | 300.3 | 351.1 | 352.5 | | |
| Soybean oilmeal or tankage..... | 57.9 | 45.2 | 52.6 | 53.1 | | |
| Mineral mixture..... | 11.3 | 8.9 | 11.1 | 10.4 | | |
| Alfalfa meal**..... | 2.0 | ..... | ..... | ..... |  |  |
| Block salt #..... | .18 | .07 | .08 | .14 | | |
| Total | 450.7 | 354.5 | 414.9 | 416.1 | | |
| Cost of feed per 100 lbs. gain | \$9.49 | \$7.59 | \$8.94 | \$8.88 | | |

#Besides receiving salt in the mineral mixture each lot had access to block salt.

Little was eaten as is seen by the amounts consumed for each 100 lb. gain.

*The feeds and minerals were mixed and self fed.

**After a number of pigs had become stiff, 3 percent of alfalfa meal was added to the rations for Lots 1 and 2 March 24 and for Lots 6 and 7 April 28.

***At the end of 15 weeks the pigs of Lot 2 had made an average gain of .72 lb. daily and taken only 551 pounds of feed for each 100 pounds of gain or only 3.3 percent more than that taken by the pigs of Lot 3 to the same approximate weight, as compared with 20.2 percent more as summarized in the table. The poor final showing made by Lot 2 is due to the pigs having suffered from stiffness during the latter part of the experiment.

Mr. Russell: Are there any questions?

Mr. Salmon: What was the fat content of the soybean oil meal?

Mr. Robison: The fat content is from 5 to 8 per cent.

Mr. Hostetler: In that lime, acid phosphate and salt mixture, what were your proportions?

Mr. Robison: They were all fed in the same proportion. All lots had access to block salt.

Mr. Hostetler: Do you use agricultural lime?

Mr. Robison: Yes, we use the sifted lime.

Mr. Hostetler: It might be interesting here that in some of our work we have done with feeding soybean oil meal at one of the test farms we have had very satisfactory results as far as shipping them to market is concerned. We have had no trouble with soft pork.

Dr. Halverson, do you know the oil content of the Havens soybean oil meal?

Dr. Halverson: I think it is around 6 per cent.

Mr. Hostetler: We had had no difficulty where we fed corn and soybean oil meal self-fed, free choice.

Mr. Russell: May I ask Mr. Hostetler what proportions did the hogs eat?

Mr. Hostetler: It would run 3 to 4 times as much soybean oil meal as fishmeal. Where they would eat 25 to 30 pounds per 100 pounds weight of fishmeal they would eat 75 to 100 pounds soybean oil meal. The total feed consumed per 100 pounds gain has not varied over 5 pounds in the two lots. The soybean oil meal would replace the corn in the fishmeal lot. It has not been economical with us because of the fact that soybean oil meal has been higher than corn, therefore, made it more expensive than the corn and fishmeal lot. They made good gains and the quality of pork was acceptable to the Richmond market.

Mr. Robison: Your two lots were corn and fishmeal and corn and soybean oil meal?

Mr. Hostetler: Yes, that was the feed.

Mr. Salmon: It is rather interesting to compare Mr. Robison's results with the hogs we fed corn and peanut meal. We fed 5 parts corn and 1 part peanut meal. In all cases where we fed the minerals and got the hogs finished out we got hard and medium hard carcasses.

Mr. Russell: Is there anything further? We are going to get back to reports of the work. Under the head of hogging-down corn and soybeans we will now have Mr. Greene's report of the experiment at the Coastal Plain Station. Mr. Hankins will now read this report for us.

Mr. Hankins:

CORN AND LAREDO SOYBEANS HOGGED DOWN WITH MINERAL
MIXTURE SELF-FED. 1925

In this experiment 20 acres of corn and soybeans were hogged down with one lot of 45 head of pigs. The experiment started September 16th and continued 56 days.

The hogs were from Spring farrowed litters and started with an initial weight of 106.3 pounds. These pigs had been on a full feed of corn and marine tankage fed on carpet grass pasture for two weeks before starting the experiment. The lot was considered the thriftiest and most uniform of any that had ever been fed at this station.

The area of the experimental field was 20 acres planted with 8 rows of Hastings Prolific white corn and 2 rows of Laredo soybeans alternately throughout the field. The area in corn was 16 acres and that in soybeans 4 acres. The stand of corn was irregular due to early damage from cutworms. The stand of beans was uniform throughout the field. The corn was fully mature with the shucks dry enough for harvesting at the time the hogs were turned on the field. The soybeans were not fully mature, most stalks having mature pods at the bottom and pods with the beans still forming at the top.

Because the beans were not mature enough to shell no attempt was made to estimate the yield. By the time the beans were fully ripe they had been mashed down and grazed by the hogs until an estimate of the yield by harvesting was impractical.

The yield of corn was estimated by gathering 8 rows at equal distances apart and entirely across the field. According to this estimate the field contained enough corn to more than carry the hogs for the full period. However, this estimate later proved to be in error probably due to the uneven stand and it was necessary to feed additional corn hauled from another field during the last ten days of the experiment.

The hogs did not take to the soybeans during the first week but after they became accustomed to them they grazed them readily, grazing the beans and Florida pusley - a volunteer growth - between the times of feeding on corn. The hogs were followed and observed on three separate mornings from the time they began feeding at daylight until they filled and lay down. The beans lasted throughout the experiment but during the last week they were practically all cleaned up although the hogs were still gleaning a few.

The Laredo bean which is a standard variety in this section has a black seed and is very small. According to current opinion hogs do not relish black beans. Counts of shelled beans showed more than 12,000 beans to the pound. The beans run two to four to the pod. Assuming that the hogs would need one pound of beans daily to balance their ration of corn they would have to gather more than 3,000 pods daily. This would necessitate a great deal of work and considerable travel. Assuming that they did eat one pound per head daily would have required a yield of 42 bushels on four acres. This would not have been an improbable yield on the field and the beans were all consumed. The oil content of the Laredo bean is reported by Piper and Morse as 14.0 per cent, being the lowest of any variety reported, the oil content of some varieties running as high as 24 per cent. Although the amount of beans consumed is not known the effect of the beans on the quality of the pork is apparently shown in the final carcass as given in the summary.

SUMMARY TABLE

CORN AND LAREDO SOYBEANS HOGGED DOWN WITH MINERALS SELF-FED

| | |
|-------------------------------------------------------------------|----------------|
| Starting date - - - - - | Sept. 16, 1925 |
| Length of period - - - - - | 56 days |
| Area grazed | |
| Corn - - - - - | 16 acres |
| Soybeans - - - - - | 4 acres |
| Number of hogs - - - - - | 45 head |
| Average initial weight - - - - - | 106.3 lbs. |
| Average final weight - - - - - | 184.7 lbs. |
| Gain per head - - - - - | 78.4 lbs. |
| Average daily gain - - - - - | 1.4 lbs. |
| Mineral consumed per head for 56 days period | 4.2 lbs. |
| (Hardwood ashes 10 pts.--16% acid phosphate 10 pts. - salt 1 pt.) | |
| ----- | |
| Committee Grading | |
| Hard - - - - - | 17 head |
| Medium hard - - - - - | 11 head |
| Soft - - - - - | 8 head |
| Medium soft - - - - - | 9 head |

Of the three check pigs killed at the beginning of the experiment two graded Medium Hard and one graded Medium Soft.

The 28 pigs that graded hard or medium hard made an average total gain of 83 pounds for the 56 day period at the rate of 1.48 pounds per day.

The 17 pigs that graded soft or medium soft made an average total gain of 70 pounds for the 56 day period at the rate of 1.25 pounds per day.

This experiment is being repeated in 1926 using two varieties of black beans and one variety of yellow beans. (Laredo - Otcotan - Mammoth Yellow)

Mr. Russell: I think there is one interesting fact in that report in that we got quite a number of soft and medium soft hogs on beans of only 14 per cent of oil. It does not mean so much but a little out of the ordinary in oil content.

The Virginia station carried on some work in this line and we will now hear Mr. Nobles report.

Mr. Nobles:

Corn-Soybeans

The pigs used on this test were Duroc-Jerseys farrowed in February and March at the experiment station farm. They were carried through the summer on residues from fields of oats, soybeans, etc. Thirty days previous to the beginning of the experiment a small amount of corn was self-fed. They had not been fed enough throughout the summer to produce the growth and thriftiness that was desired. They began the test with a rather stunted appearance and did not overcome it during the 8 weeks feeding. It is believed that they were comparatively free from parasites since a system of sanitation is followed at the sub-station farm, and whenever worms are suspected treatment is given.

Six acres of yellow corn and Haberlandt soybeans were seeded together for this group of pigs. The beans were planted in rows with the corn. They were mature when the pigs were turned into the field. The corn did not produce enough to finish the test, therefore extra hand feeding was required in order to have corn before them. The soybeans were approximately all consumed. It was observed that more beans were consumed by the pigs toward the last of the feeding period than were consumed at first. The general weather condition throughout the summer was dry.

A mineral mixture of wood ashes 10 parts (by weight), 16% acid phosphate 10 parts, and salt 1 part was supplied to this lot.

Table I, shows a summary of the gains of the pigs on corn-soybean feeding.

Table I.
Corn-Soybeans
Nov. 3 to Dec. 29, 1925 - 56 days.

| | | |
|------------------------|---|-----------|
| No. of pigs | - | 20 |
| Total initial weight | - | 2311 lbs. |
| Total final weight | - | 3849 " |
| Total gain | - | 1538 " |
| Average initial weight | - | 116. " |
| Average final weight | - | 192. " |
| Average gain | - | 77. " |
| Average daily gain | - | 1.37 " |

Approximate cost of producing feed (per pig) \$3.50

In the outline of the experiment, the initial weight desired was 125 pound pigs. These pigs fell short of that weight by about 10 pounds. The average daily gain was 1.37 pounds for the period of 56 days. The cost of growing and providing corn and soybeans was about \$3.50 per pig.

The yield of corn and soybeans was estimated in the field by harvesting four rows across the field. The approximate amount of corn was 152 bushels included the extra corn fed by hand. Estimated consumption of soybeans was 50 bushels for the lot. The amount of minerals consumed by the group was 80 pounds.

After grazing corn and soybeans the entire lot was shipped to Beltsville for slaughter under government supervision. Individual data of the feeding and slaughtering are shown in Table II:

Table II.

Data on Feeding and Slaughter of Corn-Soybean Feeding.

| Check pigs | Sex, | What Slaughter | Dressing % | | R I
Back fat | Grade |
|------------|---------|----------------|------------|-------|-----------------|-------|
| | | | Warm | Cold | | |
| | S | 92 | 78.27 | 75.00 | 1.4609 | S |
| | B | 99 | 78.79 | 76.77 | 1.4602 | M S |
| | Average | 96 | 78.53 | 75.89 | 1.4606 | |

| Lot fed 8 weeks | | | | | | | | |
|-----------------|-----|--------------------------|-------------------------------------|----------------|------------|-------|-----------------|--------|
| Pig # | Sex | Initial
wt.
(lbs.) | Wt. end of
feeding pd.
(lbs.) | Grain
(lbs) | Dressing % | | R I
Back fat | Gr |
| | | | | | Warm | Cold | | |
| 5 | S | 125 | 212 | 87 | 83.50 | 81.55 | 1.4605 | S |
| 24 | S | 120 | 190 | 70 | 83.87 | 81.72 | 1.4611 | S |
| 47 | S | 94 | 184 | 90 | 81.22 | 79.56 | 1.4609 | M S |
| 49 | S | 111 | 168 | 57 | 79.52 | 77.71 | 1.4610 | S |
| 53 | B | 94 | 158 | 64 | 81.64 | 79.11 | 1.4610 | S |
| 54 | S | 96 | 170 | 74 | 82.94 | 80.59 | 1.4610 | S |
| 72 | S | 165 | 222 | 57 | 78.43 | 76.68 | 1.4603 | S |
| 74 | B | 124 | 175 | 51 | 82.49 | 80.23 | 1.4601 | M S |
| 77 | S | 95 | 200 | 105 | 80.20 | 78.17 | 1.4602 | M S |
| 79 | B | 103 | 199 | 96 | 83.25 | 81.22 | 1.4603 | M S |
| 85 | S | 132 | 228 | 96 | 83.04 | 80.80 | 1.4608 | S |
| 99 | B | 164 | 233 | 69 | 85.46 | 83.26 | 1.4601 | M S |
| 107 | S | 145 | 212 | 67 | 83.41 | 81.46 | 1.4609 | S |
| 120 | S | 108 | 197 | 89 | 80.73 | 78.65 | 1.4608 | M S |
| 121 | S | 78 | 158 | 80 | 80.25 | 77.77 | 1.4605 | S |
| 122 | S | 97 | 184 | 87 | 81.97 | 80.34 | 1.4611 | S |
| 123 | S | 102 | 188 | 86 | 80.11 | 77.96 | 1.4605 | S |
| 124 | B | 120 | 190 | 70 | 82.35 | 80.21 | 1.4605 | M S |
| 125 | S | 133 | 191 | 58 | 82.89 | 81.28 | 1.4601 | M H |
| 126 | B | 105 | 190 | 85 | 80.85 | 78.19 | 1.4604 | M S |
| Average | | 115.5 | 192.4 | | 76.98 | 75.53 | 79.46 | 1.4606 |

The two check pigs averaged 96 pounds in weight at the time of slaughter and graded soft and medium soft. The average refractive index was 1.4606.

From the table it may be seen that the average dressing per cent for the lot of 20 was 81.53% warm and 79.46% cold. The average refractive index of back fat was 1.4606. The report of the grading work was 11 soft, 8 medium soft, and 1 medium hard.

For our next trial on corn-soybeans we expect to purchase summer farrowed pigs instead of holding early spring pigs. In this way we hope to have pigs that are more thrifty and better suited to the experiment.

Mr. Russell: That concludes all our reports on hogging-down corn and soybeans.

Mr. Vestal: I would like to ask if these hogs had all the corn they could eat during the experiment.

Mr. Nobles: Mr. Coche had charge of this work at our Williamsburg station and he reported that the corn ran out but we still kept corn before them at all times.

Mr. Robison: How did he estimate the yield of the beans?

Mr. Nobles: He said he harvested four rows and got his yield that way. I am not just sure how it was done.

Mr. Durant: What size lot was it that you got 50 bushels of beans from?

Mr. Nobles: It was 6 acres.

Mr. Vestal: These hogs were so soft that it raises the question why they should grade so soft as compared with some of the others.

Mr. Nobles: They ate considerably more soybeans than some of the other tests. The beans were the Haberlandt variety.

Mr. Russell: Is there anything further? If not, Mr. Nobles, will you give us the results of the experiment on corn, sweet potatoes and peanuts.

Mr. Nobles:

Corn-Sweet potatoes, and Peanuts

Duroc-Jersey pigs raised by the experiment station were used for this trial. These pigs were farrowed in February and March and had been carried over without any considerable amount of feeding throughout the summer. They averaged less than a 100 pounds and were not as thrifty as we like for our experiments.

Three acres of corn, one acre of sweet potatoes, and two acres of peanuts were grown for this group. We were unsuccessful in getting a good growth of peanuts, hence some extra feeding was needed. These extra peanuts were put into the self-feeder at first but it was found the pigs did not go out and forage on the corn and sweet potatoes but would stay about the self-feeders and eat peanuts. To avoid this the extra peanuts were scattered on the field.

The Big Stem Jersey variety of sweet potatoes was used. The pigs did not particularly relish these potatoes, approximately 50% of the crop remained in the field at the end of the test. It is believed that the variety has considerable to do in their eating the potatoes, probably a sweeter variety such as Porto Rica Yams would be relished more.

A summary of the results of the feeding period are shown in Table I -

Table I.

Corn-Sweet Potatoes - Peanuts.
Nov. 3 to Dec. 29, 1925 - 56 days.

| | |
|----------------------------------|-----------|
| No. of pigs - - - - - | 20 |
| Total initial weight - - - - - | 1874 lbs. |
| Total final weight - - - - - | 3293 lbs. |
| Total gain - - - - - | 1419 lbs. |
| Average initial weight - - - - - | 94 lbs. |
| Average final weight - - - - - | 165 lbs. |
| Average gain - - - - - | 71 lbs. |
| Average daily gain - - - - - | 1.27 lbs. |

Approximate cost of feeding, per pig -----\$4.65

The average gain of the pigs in this group was 71 pounds. The daily gain for eight weeks feeding was 1.27 pounds.

The yield of corn was estimated as 60 bushels. Sweet potato production was calculated to be 76 bushels and about one-half was consumed. From peanut grazing it was estimated that 700 pounds were consumed. In addition to this amount 1164 pounds of peanuts were fed in the self-feeder. The lot consumed 84 pounds of mineral mixture.

At the end of the eight weeks all pigs were shipped to Beltsville and slaughtered at the government abbatoir. The complete record of feeding and slaughter are shown in Table II.

Table II.

Individual results of feeding and killing.

| Check
Pigs | Sex | What time
of slaughter | Dressing % | | R I
Backfat | Grade |
|---------------|---------|---------------------------|------------|-------|----------------|-------|
| | | | Warm | Cold | | |
| | B | 82 | 79.27 | 76.83 | 1.4611 | S |
| | S | 92 | 79.35 | 76.19 | 1.4605 | M S |
| | Average | 87 | 79.31 | 76.44 | 1.4608 | |

Lot Fed 8 Weeks

| Pig # | Sex | Initial wt.
(lbs.) | Wt. end of
feeding pd.
(lbs.) | Grain
(lbs.) | Dressing % | | R.I
backfat | Grain |
|---------|-----|-----------------------|-------------------------------------|-----------------|------------|-------|----------------|-------|
| | | | | | Warm | Cold | | |
| 4 | B | 105 | 188 | 83 | 79.78 | 78.14 | 1.4611 | S |
| 7 | B | 74 | 128 | 54 | 77.77 | 76.19 | 1.4612 | S |
| 27 | S | 91 | 176 | 85 | 84.43 | 82.63 | 1.4609 | S |
| 32 | B | 109 | 187 | 78 | 83.06 | 80.87 | 1.4609 | S |
| 35 | B | 89 | 166 | 77 | 82.10 | 80.25 | 1.4611 | S |
| 50 | B | 76 | 158 | 82 | 82.80 | 80.89 | 1.4608 | S |
| 52 | S | 101 | 135 | 34 | 81.95 | 79.70 | 1.4617 | S |
| 55 | B | 100 | 200 | 100 | 81.87 | 79.79 | 1.4609 | S |
| 63 | B | 114 | 173 | 59 | 83.04 | 80.70 | 1.4607 | S |
| 64 | S | 89 | 163 | 74 | 82.28 | 80.38 | 1.4611 | S |
| 65 | S | 110 | 186 | 76 | 82.02 | 79.77 | 1.4610 | S |
| 68 | B | 98 | 186 | 88 | 83.24 | 80.54 | 1.4609 | S |
| 75 | S | 102 | 174 | 72 | 82.53 | 80.72 | 1.4611 | S |
| 78 | S | 104 | 195 | 91 | 83.96 | 81.82 | 1.4609 | S |
| 81 | B | 85 | 130 | 45 | 80.77 | 78.46 | 1.4611 | S |
| 91 | B | 74 | 130 | 56 | 79.51 | 77.05 | 1.4615 | S |
| 94 | B | 85 | 140 | 55 | 78.94 | 76.69 | 1.4613 | S |
| 95 | S | 98 | 163 | 65 | 81.70 | 79.74 | 1.4613 | S |
| 97 | B | 83 | 150 | 67 | 80.99 | 78.87 | 1.4613 | S |
| 98 | B | 87 | 165 | 78 | 81.17 | 79.22 | 1.4611 | S |
| Average | | 93.7 | 164.6 | 70.9 | 81.84 | 79.77 | 1.4611 | |

The check pigs averaged 87 pounds at the time they were slaughtered at Beltsville. The two graded soft and medium soft. The average refractive index was 1.4608.

After grazing on corn, sweet potatoes and peanuts for eight weeks the lot of twenty pigs were all slaughtered. The average dressing percentage was 81.84% warm and 79.77% cold. The refractive index was 1.4611, all pigs grading soft.

Mr. Russell: Have you the proportions of corn, sweet potatoes and peanuts?

Mr. Nobles: The proportions were as follows:

| | | |
|---------------------|------|-------|
| Corn | 3.75 | pound |
| Sweet potatoes | 1.62 | " |
| Peanuts | 1.62 | " |

Mr. Robison: Did they clean the peanuts up after they were scattered through the field?

Mr. Nobles: After they were scattered in the field they ate the peanuts.

Mr. Russell: It is interesting to me that they prefer peanuts to corn.

Mr. Nobles: They did not seem to relish the sweet potatoes at all. The peanuts we bought and scattered in the field were the Virginias and Valencia. They were very good quality.

Mr. Hankins: The peanuts you grew were Spanish?

Mr. Nobles: Yes, they were.

Mr. Russell: We have been asked the question different times if the hog preferred peanuts to corn. It is one of the things we would like to find out.

Mr. Nobles: This indicates they did.

Mr. Russell: I have had farmers in the south tell me that they would not eat peanuts if they could get corn and had others tell me that they would not eat corn if they could get peanuts.

Mr. Hostetler: How had these pigs been fed previously?

Mr. Nobles: They had just been in the fields cleaning up during the summer. They had a little corn just before. They had corn and soybeans previously.

Mr. Templeton: We had several tests of that kind and we found the pigs preferred peanuts.

Mr. Russell: I have talked to farmers in the south and others interested and I was just wondering if the hog might consume the peanut crop in this way and still be hard. We made a couple of tests with sweet potatoes in dry lot. We had all hard hogs. When they were slaughtered they looked very sloppy. They graded out very hard. The question had come up as to whether sweet potatoes produced hard hogs.

Mr. Salmon: I have one year's work with corn and peanuts grown in the same field. I could not get them to eat the corn. We have three year's dry lot work corn and peanuts free choice but I think we got about 18 pounds of corn consumed for each 100 pounds of peanuts.

Me. Durant: In feeding peanut oil meal with shelled corn they will eat the peanut oil meal before they will eat the corn.

Mr. Russell: We will now hear from Mr. Nobles on hardening peanut hogs.

Mr. Nobles:

Peanut Feeding

For this experiment we secured 20 purebred Duroc-Jersey pigs that averaged approximately 50 pounds in weight. These pigs came from near Danville, Virginia, and were very nice thrifty pigs. Due to a poor germination and dry weather not enough peanuts were grown for grazing, hence the optional plan of self-feeding had to be followed.

The Virginia variety of peanut was purchased at first and proved to be a very inferior grade of nuts. The second purchase of Valencia peanuts, however, were of very good quality. Both varieties were fed as whole nuts.

The data on feed and gains for 8 weeks on softening are shown in Table I.

Table I.

Results of Peanut Feeding
Nov. 3 to Dec. 29, 1925 - 56 days

| | |
|----------------------------------|-----------|
| No. of pigs - - - - - | 20 |
| Total initial weight - - - - - | 1054 lbs. |
| Total final weight - - - - - | 1764 lbs. |
| Total gain of lot - - - - - | 700 lbs. |
| Average initial weight - - - - - | 53. |
| Average final weight - - - - - | 88. |
| Average gain - - - - - | 35. |
| Average daily gain - - - - - | .625 |

The average gains made by the pigs on peanut feeding were rather small. They did not continue to show the thriftiness and smoothness as was noticeable at the beginning of the test.

It was estimated that 400 pounds of peanuts were grazed from the peanut field. In addition to this amount 1377 pounds were self-fed, making the total consumption approximately 1777 pounds. Based upon this amount, which is partially estimate, the pigs consumed on the average 1.6 pounds of peanuts per day for the period of 56 days. Thirty pounds of mineral mixture* was consumed by the lot during the same period.

*Gov't Mineral Mixture: Charcoal 75 lbs., raw rock phosphate 3 lbs., salt 6 lbs, ground limestone 6 lbs, flowers of sulphur 3 lbs. copperas 1 lbs. and Glaubies salts 6 lbs.

After feeding on peanuts alone 8 weeks the pigs were self-fed corn and tankage. Data shown in Table II.

Table II.

Hardening Periods.

20 pigs fed for 8 weeks -

Total feed consumed:

| | |
|------------|-------------|
| Corn - | 5734 lbs. |
| Tankage - | 337 lbs. |
| Minerals - | <u>53 "</u> |
| | 6124 lbs. |

Daily feed per pig:

| | |
|------------|----------|
| Corn - | 5.1 lbs. |
| Tankage - | .3 " |
| Minerals - | .047 " |

15 pigs fed for 4 weeks -

Total feed consumed:

| | |
|------------|-------------|
| Corn - | 1240 lbs. |
| Tankage - | 184 " |
| Minerals - | <u>18 "</u> |
| | 1442 |

Daily feed per pig:

| | |
|------------|----------|
| Corn - | 3.0 lbs. |
| Tankage - | .44 " |
| Minerals - | .043 " |

Weights were secured on the five pigs that were shipped for slaughter at the conclusion of each hardening period. Data on two of these groups are shown in Table III.

Table III.

Individual weights and gains of pigs slaughtered -

| <u>Pig #</u> | <u>Initial weight</u> | <u>Gain on
Peanuts</u> | <u>Gain on
Corn & Tankage</u> | <u>Final
wt.</u> | <u>Grade</u> |
|--------------------------------------|-----------------------|----------------------------|---------------------------------------|----------------------|--------------|
| (After 8 weeks on corn and tankage) | | | | | |
| 5 | 54 | 43 | 84 | 181 | M S |
| 7 | 62 | 45 | 77 | 184 | S |
| 16 | 75 | 55 | 86 | 216 | M S |
| 18 | 60 | 45 | 105 | 210 | M S |
| 19 | 64 | 36 | 90 | 190 | M S |
| Average | <u>63</u> | <u>44.8</u> | <u>88.4</u> | <u>196.2</u> | |
| (After 12 weeks on corn and tankage) | | | | | |
| 2 | 55 | 35 | 115 | 205 | M S |
| 3 | 50 | 36 | 86 | 172 | M S |
| 10 | 49 | 40 | 91 | 180 | S |
| 11 | 58 | 27 | 99 | 194 | H |
| 14 | 47 | 33 | 136 | 216 | M H |
| Average | <u>51.8</u> | <u>34.2</u> | <u>105.2</u> | <u>193.4</u> | |

Our plan called for a shipment at the end of 4 weeks feeding on the hardening ration, but due to some misunderstanding they were not sent in for slaughter until the end of 8 weeks.

Five of the heaviest pigs averaged 88.4 pounds gain on 56 days corn and tankage feeding. This is 1.58 pounds per day. The average final weight of the group was 196.2 pounds. The grading committee found the pigs to grade 1 soft and 4 medium soft.

The next shipment 4 weeks later or at the end of 12 weeks feeding on corn and tankage consisted of pigs having smaller initial weights and averaging 105.2 pounds gain to the group on hardening feed. The average daily gain was 1.25 pounds. The final weight of 193.4 pounds was slightly less than was the final weight of the pigs 4 weeks previous. The reports of the grading committee showed considerable improvement over the group killed 4 weeks before. One pig killed out soft, 2 medium soft, 1 medium hard, and 1 hard.

(The group to be fed 16 and 20 weeks on corn and tankage have not been completed)

Mr. Russell: Are there any questions? If not we will now adjourn until afternoon.

Wednesday afternoon.

Mr. Russell: We will now come to order. We will now finish up the reports on experimental work before taking up anything else. We have this manuscript for the bulletin to discuss and to approve or disapprove or whatever is decided. We will go on with experimental reports.

Rice By-Products

Mr. Russell: In the rice by-product work we have the Arkansas, Iberia, Mississippi and Beltsville stations. We will now hear from Mr. Martin of Arkansas.

Mr. Martin:

Review of 1924-25 experiment.--- During the fiscal year 1924-25 the University of Arkansas Experiment Station fed rice bran and rice polish to pigs weighing 83 pounds at the beginning of the experiment. The pigs were continued on these feeds for eight weeks, and then were fed for eight weeks on brewers' rice and corn. All feeds were supplemented with tankage and minerals, free choice.

The feeding results on rice bran and rice polish were unsatisfactory. The average daily gain was low, and, generally the pigs presented an unthrifty appearance. This was particularly true of the rice bran lot.

The rice bran used contained 16.2 per cent fiber, which shows this particular lot to have been of very low grade.

The feeding results on the brewers' rice and corn were very satisfactory.

From this trial, the following may be concluded:

1. Rice bran produces soft pork.
2. When fed with tankage, greater gains are obtained from rice polish than rice bran.
3. As a hardening feed, brewers' rice is superior to corn.
4. More economical gains were obtained from feeding brewers' rice than from feeding corn.

THE 1925-26 TRIAL.

Objectives.--- The objects of this experiment were:

1. To compare rice bran and rice polish as feeds for fattening swine.
2. When pigs have been fed for eight weeks on rice bran and rice polish, to find the firmness of pork produced by feeding for eight weeks on brewers' rice and corn, all feeds supplemented with tankage and minerals.
3. To compare brewers' rice and corn as feeds for fattening swine.

Plan of the experiment.---For this experiment, 40 pigs averaging 67.5 pounds were used. Of these, 20 were on rice bran and 20 on rice polish during the first eight weeks. These were lots I and II respectively.

For the next eight weeks feeding, lot I was divided into lots III and IV, and lots V and VI were made up from lot II. Lots III and V received brewers' rice while lots IV and VI received corn. All lots received tankage and minerals.

Feeds used.The by-products of rice for this experiment were obtained from the Arkansas Rice Growers' Cooperative Association, Stuttgart.

The rice bran used was probably low-grade as it fed very poorly, and contained considerable rice hulls.

The rice polish seemed to be of good quality, but had an undesirable physical effect on the animals.

The corn was No. 2 yellow, and the tankage was the 60-percent-protein grade.

Vaccination.---All the pigs used in this experiment were given the simultaneous treatment for hog cholera.

Methods of feeding.---All lots were self fed, free choice at all times. The feed weigh backs were taken at the end of each two-weeks period.

Weighing.---This experiment started January 12 and closed May 4, 1926. The pigs were weighed three times at the beginning, at the end of the first eight-weeks period, and at the close of the experiment.

Feeding during the softening period.---This period began on January 12 and continued for 56 days. Table I presents a detailed study of the feeding results during this period.

By referring to table I, it will be noted that the average daily gains were .42 and .52 pounds for the rice bran and rice polish fed lots respectively.

These gains are unsatisfactory, and the pigs generally appeared unthrifty, which was particularly true of the rice bran lot.

The following table indicates the prices paid for the various feeds:

| | | |
|---------------|---------|------------|
| Rice bran | \$25.13 | per ton |
| Rice polish | 35.13 | " " |
| Brewers' rice | 44.13 | " " |
| Tankage | 85.00 | " " |
| Shelled corn | .81 | " bu. |
| Minerals | 1.00 | " 100 lbs. |

Feeding during the hardening period.--Table II gives a detailed study of feeding the four lots during the hardening period.

It will be noted that brewers' rice has the advantage of corn in feed required for 100 pounds of gain, but that the cost of 100 pounds of gain was nearly one dollar less for the corn fed pigs.

Brewers' rice vs. corn for fattening pigs.-- By adding the results obtained in the two brewers' rice lots, and, in the same way, adding the results obtained in the two corn lots, we get a direct comparison of brewers' rice and corn. Table III is given for convenience in making this comparison.

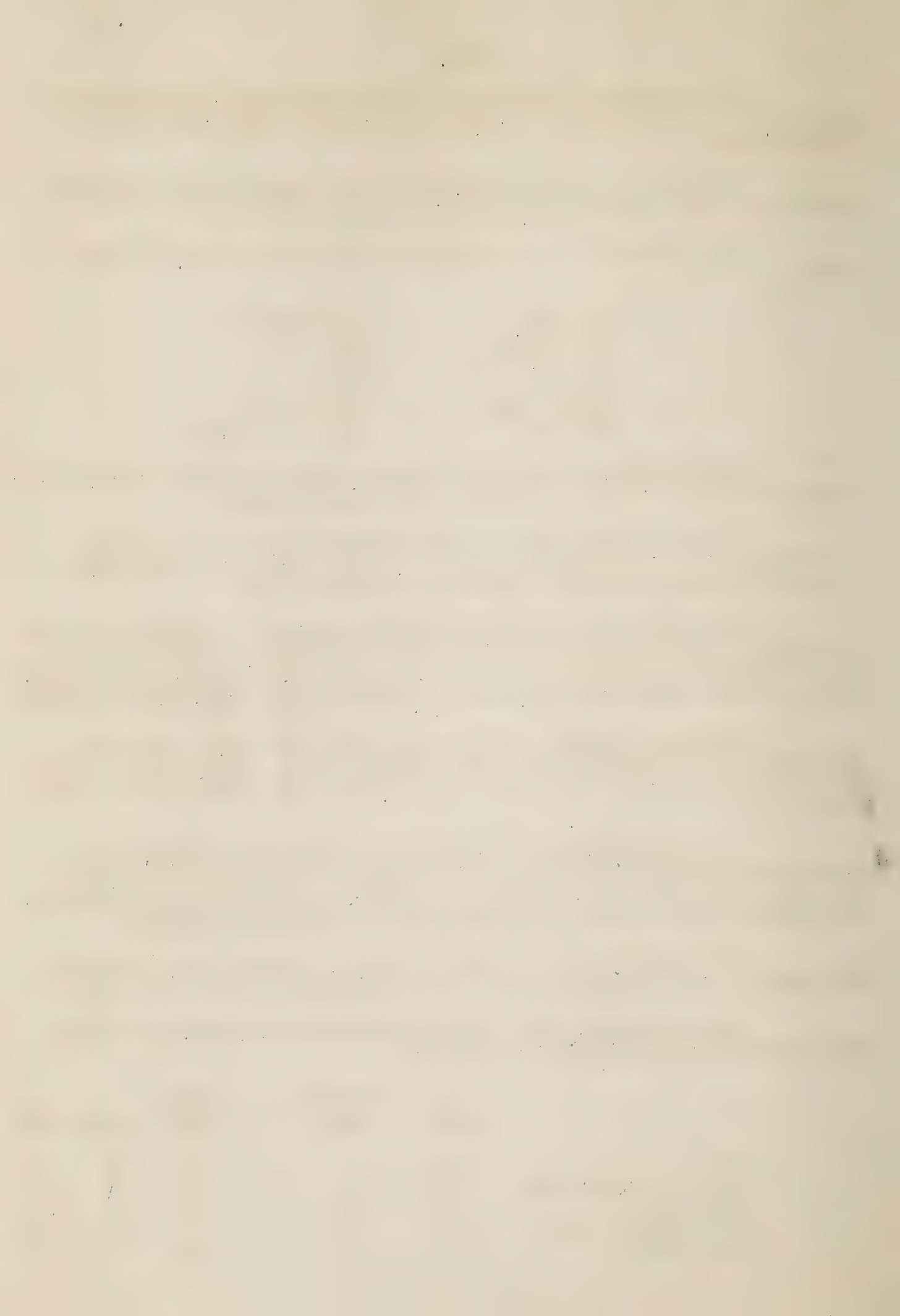
Behavior of animals.--There were several unthrifty pigs in the rice bran lot at the end of the first feeding period. The pigs in the rice polish lot were somewhat healthier, but even the pigs in this lot were not normal.

It is interesting to note that the pigs on rice bran and rice polish only averaged .43 pounds per day during the last two weeks in these lots, and during the first two weeks on brewers' rice and corn, supplemented with tankage and minerals, 2.00 pounds was the average daily gain.

The response to the change in feed was immediate and pronounced, and showed in the general appearance of the pigs as well as on the scales.

Slaughter data.--The following summarizes the committee grading of the various lots including the checks:*

| | <u>Hard</u> | <u>Medium</u>
<u>Hard</u> | <u>Medium</u>
<u>Soft</u> | <u>Soft</u> | <u>Oily</u> |
|-----------------------|-------------|------------------------------|------------------------------|-------------|-------------|
| Check | ---- | ---- | ---- | 3 | ---- |
| Lot III Brewers' rice | 2 | 2 | 2 | 2 | 1 |
| Lot IV Corn | 2 | 4 | 2 | 1 | ---- |
| Lot V Brewers' rice | 5 | 4 | 1 | ---- | ---- |
| Lot VI Corn | 8 | ---- | ---- | 1 | ---- |



Summary.--The following is a brief summary of the experiment:

1. Rice bran and rice polish produce soft pork.
2. Greater gains were obtained from feeding rice polish than from feeding rice bran, but both were unsatisfactory as feeds in this trial.
3. The slaughter data indicate little if any difference in the value of brewers' rice and corn as hardening feeds.
4. More economical results were obtained from feeding corn than from feeding brewers' rice.

* Note.--One pig died in transit to Beltsville, and two are not included in the summary because of error in numbers reported.

1. The first part of the report is devoted to a general survey of the situation in the country.

2. The second part of the report is devoted to a detailed analysis of the economic situation.

3. The third part of the report is devoted to a detailed analysis of the social situation.

4. The fourth part of the report is devoted to a detailed analysis of the political situation.

5. The fifth part of the report is devoted to a detailed analysis of the cultural situation.

6. The sixth part of the report is devoted to a detailed analysis of the international situation.

7. The seventh part of the report is devoted to a detailed analysis of the future prospects.

8. The eighth part of the report is devoted to a detailed analysis of the conclusions.

9. The ninth part of the report is devoted to a detailed analysis of the recommendations.

10. The tenth part of the report is devoted to a detailed analysis of the appendixes.

Table I: On feeds that produce soft fat.

| | Lot I
<u>Rice Bran</u> | Lot II
<u>Rice Polish</u> |
|-----------------------------|---------------------------|------------------------------|
| No. of pigs per lot..... | 20 | 20 |
| No. of days on feed | 56 | 56 |
| Average initial weight..... | 67.4 | 67.7 |
| Average final weight..... | 91.0 | 96.9 |
| Average daily gain..... | .42 | .52 |

Average daily feed:

| | | |
|------------------|-------|-------------|
| Rice bran..... | 2.62 | ----- |
| Rice polish..... | ----- | 2.43 |
| Tankage..... | .25 | .34 |
| Minerals..... | .01 | .02 |
| Total..... | 2.82 | <u>2.79</u> |

Feed for 100 pounds gain:

| | | |
|------------------|-------|--------------|
| Rice bran..... | 623.2 | ----- |
| Rice polish..... | ----- | 465.0 |
| Tankage..... | 56.9 | 64.6 |
| Minerals..... | 3.0 | 4.4 |
| Total..... | 683.1 | <u>534.0</u> |

Cost for 100 pounds gain:

| | | |
|------------------|-------|--------------|
| Rice bran..... | 7.83 | ----- |
| Rice polish..... | ----- | 8.17 |
| Tankage.. .. | 2.43 | 2.75 |
| Minerals..... | .03 | .04 |
| | 10.29 | <u>10.96</u> |

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Table II: On feeds that produce firm fat.

| | Lot III
<u>Brewer's rice</u> | Lot IV
<u>Corn</u> | Lot V
<u>Brewer's rice</u> | Lot VI
<u>Corn</u> |
|-----------------------------|---------------------------------|-----------------------|-------------------------------|-----------------------|
| No. of pigs per lot..... | 10 | 10 | 10 | 10 |
| No. of days on feed..... | 56 | 56 | 56 | 56 |
| Average initial weight..... | 90.4 | 91.5 | 96.9 | 97.0 |
| Average final weight..... | 208.2 | 208.2 | 220.1 | 201.9 |
| Average daily gain..... | 2.10 | 2.08 | 2.20 | 1.87 |

Average daily feed:

| | | | | |
|---------------------|-------------|-------------|-------------|-------------|
| Brewer's rice..... | 5.20 | ----- | 7.42 | ----- |
| Corn (shelled)..... | ----- | 7.64 | ----- | 6.96 |
| Tankage..... | .25 | .30 | .25 | .31 |
| Minerals..... | .02 | .01 | .02 | .02 |
| Total..... | <u>5.47</u> | <u>7.95</u> | <u>7.69</u> | <u>7.29</u> |

Feed for 100 pounds gain:

| | | | | |
|--------------------|--------------|--------------|--------------|--------------|
| Brewer's rice..... | 247.2 | ----- | 337.1 | ----- |
| Corn..... | ----- | 366.7 | ----- | 371.3 |
| Tankage..... | 12.1 | 14.4 | 11.5 | 16.8 |
| Minerals..... | 1.1 | .6 | .7 | 1.0 |
| Total..... | <u>260.4</u> | <u>381.7</u> | <u>349.3</u> | <u>389.1</u> |

Cost for 100 pounds gain:

| | | | | |
|--------------------|-------------|-------------|-------------|-------------|
| Brewer's rice..... | 5.45 | ----- | 7.44 | ----- |
| Corn..... | 5.32 | 5.30 | ----- | 5.37 |
| Tankage..... | .51 | .61 | 1.49 | .71 |
| Minerals..... | .01 | .01 | .01 | .01 |
| Total..... | <u>5.97</u> | <u>5.92</u> | <u>8.94</u> | <u>6.09</u> |

Table III: Brewers' rice vs. corn for fattening swine:

| | Lot VII
Brewers' rice | Lot VIII
<u>Corn</u> |
|-----------------------------------|--------------------------|-------------------------|
| No. of pigs per lot..... | 20 | 20 |
| No. of days on feed..... | 56 | 56 |
| Average initial weight..... | 93.7 | 94.2 |
| Average final weight..... | 214.2 | 205.1 |
| Average daily gain..... | 2.15 | 1.98 |
| <u>Average daily feed:</u> | | |
| Brewers' rice..... | 6.31 | ---- |
| Corn (shelled)..... | ---- | 7.30 |
| Tankage..... | .25 | .31 |
| Minerals..... | .02 | .02 |
| Total..... | 6.58 | 7.63 |
| <u>Feeds for 100 pounds gain:</u> | | |
| Brewers' rice..... | 293.2 | ---- |
| Corn..... | ---- | 368.8 |
| Tankage..... | 11.8 | 15.5 |
| Minerals..... | .9 | .8 |
| Total..... | 305.9 | 385.1 |
| <u>Cost for 100 pounds gain:</u> | | |
| Brewers' rice..... | 6.47 | ---- |
| Corn..... | ---- | 5.33 |
| Tankage..... | .50 | .66 |
| Minerals..... | .01 | .01 |
| Total..... | 6.98 | 6.00 |

Mr. Russell: Are there any questions? If not we will now hear from Mr. Quesenberry of the Iberia Station.

Mr. Quesenberry:

RICE POLISH, TANKAGE & SKIM MILK - FOLLOWED BY
BREWER'S RICE, TANKAGE, AND SKIM MILK,
AND CORN, TANKAGE & SKIM MILK

For this experiment 43 Pure-bred Tamworth pigs averaging 68 pounds at that start were used. Before beginning the experiment three of these were shipped to Beltsville as checks. The check pigs weighed 59, 65, and 42 pounds. These three pigs killed medium soft. The remaining 40 pigs were fed in one lot for eight weeks and received Rice Polish, Tankage, Skim Milk, and a Mineral Mixture.

At the end of eight weeks the 40 pigs were re-allotted and Lot 1 fed Shelled Corn, Skim Milk, Tankage, and Mineral Mixture, and Lot 2 was fed Brewer's Rice, Skim Milk, Tankage, and Mineral Mixture.

During the first 8 weeks on Rice Polish the lot made an average daily gain of 1.00 pounds per head. The feed consumption per 100 pounds of gain was 336.68 pounds Rice Polish, 12.81 pounds Tankage, 299.0 pounds Skim Milk, and 8.45 pounds of Mineral Mixture.

During the second 8 weeks feeding Lot 1 fed Shelled Corn gained 1.57 pounds daily, and Lot 2 fed Brewer's Rice gained 1.82 pounds daily. It required 336.0 pounds of Shelled Corn, 10.0 pounds of Tankage, 223.0 pounds Skim Milk, and 5.14 pounds of Mineral Mixture to make 100 pounds of gain in Lot 1. Lot 2 required 330.0 pounds of Brewer's Rice, 8.0 pounds of Tankage, 194.0 pounds of Skim Milk, and 5.0 pounds of Mineral Mixture for each 100 pounds of gain.

The following tabulation shows how these pigs were fed and gained during the suckling period, after weaning, and during the experiment.

Two hogs were removed from the experiment at the end of the Rice Polish feeding period. One died from the effects of being overheated, and the other was paralyzed in the hind quarters. All of the remaining hogs were slaughtered after the second eight weeks feeding period. In the corn lot there was one soft hog, one hard, six medium hards, and 12 medium softs. In the Brewer's Rice lot all hogs killed hard except one which was medium soft.

1880

RICE POLISH 8 WEEKS TO LOTS NOS. 1 & 2 FOLLOWED BY SHELLED CORN 8 WEEKS
TO LOT NO. 1 AND BREWER'S RICE 8 WEEKS TO LOT NO. 2
EXPERIMENT NO. 7

SUMMARY OF SECOND 56 DAYS FEEDING - P. M. Feed August 6, 1925
 To A. M. Feed October 1, 1925. Inclusive.

| | | | | | |
|-------------------------------------------|---------|---|---------|---|---|
| : LOT NUMBER..... | 1 | : | 2 | : | : |
| : | : | : | : | : | : |
| : | : | : | : | : | : |
| : Number of Hogs in Lot..... | 20. | : | 18 | : | : |
| : Number of Days Fed..... | 56. | : | 56 | : | : |
| : Initial Weight - All Hogs..... | 2491.00 | : | 2257.00 | : | : |
| : Final Weight - All Hogs..... | 4261.00 | : | 4091.00 | : | : |
| : Initial Weight Per Hog..... | 125.00 | : | 125.00 | : | : |
| : Final Weight Per Hog..... | 213.00 | : | 227.00 | : | : |
| : Total Gain Per Hog During Experiment... | 88.00 | : | 102.00 | : | : |
| : Average Daily Gain..... | 1.57 | : | 1.82 | : | : |
| : | : | : | : | : | : |
| : <u>FEED CONSUMED - ALL HOGS:</u> | : | : | : | : | : |
| : Shelled Corn..... | 5961.00 | : | ..... | : | : |
| : Brewer's Rice..... | ..... | : | 6049.05 | : | : |
| : Tankage..... | 177.00 | : | 146.00 | : | : |
| : Skim Milk..... | 3946.40 | : | 3552.16 | : | : |
| : Mineral Mixture..... | 91.00 | : | 88.99 | : | : |
| : | : | : | : | : | : |
| : <u>FEED CONSUMED PER HOG:</u> | : | : | : | : | : |
| : Shelled Corn | 298.05 | : | ..... | : | : |
| : Brewer's Rice..... | ..... | : | 336.06 | : | : |
| : Tankage..... | 8.85 | : | 8.11 | : | : |
| : Skim Milk..... | 197.32 | : | 197.34 | : | : |
| : Mineral Mixture..... | 4.55 | : | 4.94 | : | : |
| : | : | : | : | : | : |
| : <u>AV. DAILY FEED CONSUMED PER HOG:</u> | : | : | : | : | : |
| : Shelled Corn | 5.32 | : | ..... | : | : |
| : Brewer's Rice..... | ..... | : | 6.00 | : | : |
| : Tankage..... | .16 | : | .14 | : | : |
| : Skim Milk..... | 3.52 | : | 3.52 | : | : |
| : Mineral Mixture..... | .08 | : | .08 | : | : |
| : | : | : | : | : | : |
| : <u>FEED EATEN PER CWT. GAIN:</u> | : | : | : | : | : |
| : Shelled Corn..... | 336.78 | : | ..... | : | : |
| : Brewer's Rice..... | ..... | : | 329.83 | : | : |
| : Tankage..... | 10.00 | : | 7.96 | : | : |
| : Skim Milk..... | 222.96 | : | 193.68 | : | : |
| : Mineral Mixture..... | 5.14 | : | 4.85 | : | : |

RICE POLISH 8 WEEKS TO LOTS NOS. 1 & 2 FOLLOWED BY SHELLED CORN 8 WEEKS
TO LOT NO. 1 AND BREWER'S RICE 8 WEEKS TO
LOT NO. 2 EXPERIMENT NO. 7

SUMMARY OF FIRST 56 DAYS - P. M. Feed June 11, 1925 To A. M. Feed
August 6, 1925, Inclusive.

Number of Hogs in Lot..... 40.
Number of Days in Period..... 56.
Initial Wt. All Hogs..... 2729.00
Final Wt. All Hogs..... 4978.00
Initial Wt. Per Hog..... 68.00
Final Wt. Per Hog..... 124.00
Total Gain All Hogs..... 2249.00
Total Gain Per Hog..... 56.00
Av. Daily Gain Per Hog..... 1.00

TOTAL FEED CONSUMED:

| | <u>ALL HOGS</u> | <u>PER HOG</u> |
|----------------------|-----------------|----------------|
| Rice Polish..... | 7572.00 | 189.30 |
| Tankage..... | 288.00 | 7.20 |
| Skim Milk..... | 6724.00 | 168.10 |
| Mineral Mixture..... | 190.00 | 4.75 |

AV. DAILY FEED PER HOG:

| | |
|----------------------|------|
| Rice Polish..... | 3.38 |
| Tankage..... | .13 |
| Skim Milk | 3.00 |
| Mineral Mixture..... | .08 |

FEED EATEN PER CWT. GAIN:

| | |
|----------------------|--------|
| Rice Polish..... | 336.68 |
| Tankage..... | 12.81 |
| Skim Milk..... | 298.98 |
| Mineral Mixture..... | 8.45 |

The first of these is the fact that the
the second is the fact that the
the third is the fact that the

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the thirteenth is the fact that the
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the twenty-first is the fact that the
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the twenty-sixth is the fact that the
the twenty-seventh is the fact that the
the twenty-eighth is the fact that the
the twenty-ninth is the fact that the
the thirtieth is the fact that the

Mr. Russell: Are there any questions? If not we will hear from Mr. Templeton of the Mississippi station.

Mr. Templeton:

The experiment under way at the Mississippi Station this year is a duplication very largely of the rice by-product feeding test of last year. In the previous test, the initial weight of the pigs was sixty-eight pounds and the feeding results for the first period with rice bran and rice polish was very unsatisfactory. In this year's work, pigs with an initial weight of a hundred and thirty-six pounds were used. The pigs were from three litters from Poland China sows and sired by a Duroc Jersey boar. They were all very uniform, thrifty, and well developed when the test was started.

The plan of the experiment called for an eight weeks feeding period on rice polish and rice bran with a finishing period of eight weeks on corn and tankage. At the beginning of the test, four check pigs averaging a hundred and twenty-nine pounds were shipped to Beltsville for slaughter. The Committee grading for the carcasses was two medium soft and two medium hard.

The following tables will give the results for the two feeding periods:

Summary of Feeding Trial with Rice By-Products
December 11, 1925 to February 4, 1926 (56 Days)

Breeding of PigsDuroc-Polands

| Lot | I | II | III |
|------------------------------------------------|---------|---------|---------|
| Ration | Corn | Rice | Rice |
| | Tankage | Polish, | Bran |
| | | Tankage | Tankage |
| Number of Hogs | 8. | 8. | 8. |
| Total Initial Weight (lbs.) | 1098. | 1087. | 1081. |
| Average Initial Weight (lbs.) | 137. | 136. | 135. |
| Total Final Weight (lbs.) | 1992. | 2063. | 1873. |
| Average Final Weight (lbs.) | 249. | 258. | 234. |
| Total Gain (lbs.) | 894.00 | 976.00 | 792.00 |
| Average Gain per Hog (lbs.) | 111.75 | 122.00 | 99.00 |
| Average Daily Gain (lbs.) | 1.99 | 2.18 | 1.77 |
| Total Feed Consumed | | | |
| Corn (lbs.) | 3697. | - | - |
| Rice Polish (lbs.) | - | 3318. | - |
| Rice Bran (lbs.) | - | - | 3007. |
| Tankage (lbs.) | 170. | 139. | 189. |
| Total Feed Consumed per 100 pounds Gain (lbs.) | 432.53 | 354.29 | 403.54 |
| Corn (lbs.) | 413.52 | - | - |
| Rice Polish (lbs.) | - | 339.96 | - |
| Rice Bran (lbs.) | - | - | 379.68 |
| Tankage (lbs.) | 19.01 | 14.24 | 23.86 |

1. The first part of the paper is devoted to a general discussion of the problem of the existence of solutions of the system of equations

$$\frac{dx}{dt} = f(x, y, z), \quad \frac{dy}{dt} = g(x, y, z), \quad \frac{dz}{dt} = h(x, y, z),$$

where f, g, h are continuous functions of x, y, z and satisfy the Lipschitz condition. It is shown that if the initial conditions are given at a point where the functions f, g, h are not continuous, then the solution may not exist. This is illustrated by an example. The second part of the paper is devoted to a study of the stability of the solutions of the system of equations. It is shown that if the functions f, g, h are continuous and satisfy the Lipschitz condition, then the solutions are stable. This is illustrated by an example.

2. The second part of the paper is devoted to a study of the stability of the solutions of the system of equations. It is shown that if the functions f, g, h are continuous and satisfy the Lipschitz condition, then the solutions are stable. This is illustrated by an example.

3. The third part of the paper is devoted to a study of the stability of the solutions of the system of equations. It is shown that if the functions f, g, h are continuous and satisfy the Lipschitz condition, then the solutions are stable. This is illustrated by an example.

4. The fourth part of the paper is devoted to a study of the stability of the solutions of the system of equations. It is shown that if the functions f, g, h are continuous and satisfy the Lipschitz condition, then the solutions are stable. This is illustrated by an example.

5. The fifth part of the paper is devoted to a study of the stability of the solutions of the system of equations. It is shown that if the functions f, g, h are continuous and satisfy the Lipschitz condition, then the solutions are stable. This is illustrated by an example.

6. The sixth part of the paper is devoted to a study of the stability of the solutions of the system of equations. It is shown that if the functions f, g, h are continuous and satisfy the Lipschitz condition, then the solutions are stable. This is illustrated by an example.

Summary of Finishing Period with Corn and Tankage

February 5 to April 1, 1926 (56 Days)

| Lot | I | II | III |
|-----------------------------------------|-----------------|-----------------|-----------------|
| Ration | Corn
Tankage | Corn
Tankage | Corn
Tankage |
| Number of Hogs | 8. | 8. | 8. |
| Total Initial Weight (lbs.) | 1992. | 2063. | 1873. |
| Average Initial Weight (lbs.) | 249. | 258. | 234. |
| Total Final Weight (lbs.) | 2749. | 2805. | 2795. |
| Average Final Weight (lbs.) | 343. | 351. | 349. |
| Total Gain (lbs.) | 757. | 742. | 922. |
| Average Gain per Hog (lbs.) | 94.62 | 92.75 | 115.25 |
| Average Daily Gain (lbs.) | 1.69 | 1.66 | 2.06 |
| Total Feed Consumed | | | |
| Corn (lbs.) | 3713. | 4140. | 3719. |
| Tankage (lbs.) | 137. | 82. | 53. |
| Total Feed Consumed per 100 Pounds Gain | | | |
| Corn (lbs.) | 490.50 | 557.95 | 403.30 |
| Tankage (lbs.) | 18.09 | 11.05 | 5.74 |

| | Gain on Softening Feed | Gain on Hardening Feed | Gain Ratio |
|---------|------------------------|------------------------|------------|
| Lot I | III. | 94. | 1 : .8468 |
| Lot II | 122. | 92. | 1 : .7541 |
| Lot III | 99. | 115. | 1 : 1.1610 |

The Committee grading for the three lots was as follows:

- Lot I - Eight carcasses, hard
- Lot II - Three hard, five medium hard
- Lot III - Two medium soft, six medium hard

The refractive index grading checks very closely the report of the Committee.

apparent from the fact that the following is the

list of the names of the persons who

| Name | | | Address |
|------------|------------|----------|-------------------|
| First Name | Last Name | Initials | |
| John | Smith | J. S. | 123 Main St. |
| James | Johnson | J. J. | 456 Elm St. |
| Robert | Brown | R. B. | 789 Oak St. |
| William | Wilson | W. W. | 101 Pine St. |
| Charles | Clark | C. C. | 202 Cedar St. |
| Thomas | Thomas | T. T. | 303 Birch St. |
| Richard | Richardson | R. R. | 404 Spruce St. |
| Joseph | Josephson | J. J. | 505 Willow St. |
| Henry | Henry | H. H. | 606 Ash St. |
| George | George | G. G. | 707 Hickory St. |
| Edward | Edwards | E. E. | 808 Sycamore St. |
| Frank | Franklin | F. F. | 909 Magnolia St. |
| Albert | Albertson | A. A. | 1010 Poplar St. |
| Samuel | Samuelson | S. S. | 1111 Chestnut St. |
| Benjamin | Benjamin | B. B. | 1212 Walnut St. |
| Moses | Moses | M. M. | 1313 Elm St. |
| David | Davidson | D. D. | 1414 Oak St. |
| John | Johnston | J. J. | 1515 Pine St. |
| William | Williamson | W. W. | 1616 Cedar St. |
| Charles | Charles | C. C. | 1717 Birch St. |
| Thomas | Thomas | T. T. | 1818 Spruce St. |
| Richard | Richardson | R. R. | 1919 Willow St. |
| Joseph | Josephson | J. J. | 2020 Ash St. |
| Henry | Henry | H. H. | 2121 Hickory St. |
| George | George | G. G. | 2222 Sycamore St. |
| Edward | Edwards | E. E. | 2323 Magnolia St. |
| Frank | Franklin | F. F. | 2424 Poplar St. |
| Albert | Albertson | A. A. | 2525 Chestnut St. |
| Samuel | Samuelson | S. S. | 2626 Walnut St. |
| Benjamin | Benjamin | B. B. | 2727 Elm St. |
| Moses | Moses | M. M. | 2828 Oak St. |
| David | Davidson | D. D. | 2929 Pine St. |
| John | Johnston | J. J. | 3030 Cedar St. |
| William | Williamson | W. W. | 3131 Birch St. |
| Charles | Charles | C. C. | 3232 Spruce St. |
| Thomas | Thomas | T. T. | 3333 Willow St. |
| Richard | Richardson | R. R. | 3434 Ash St. |
| Joseph | Josephson | J. J. | 3535 Hickory St. |
| Henry | Henry | H. H. | 3636 Sycamore St. |
| George | George | G. G. | 3737 Magnolia St. |
| Edward | Edwards | E. E. | 3838 Poplar St. |
| Frank | Franklin | F. F. | 3939 Chestnut St. |
| Albert | Albertson | A. A. | 4040 Walnut St. |
| Samuel | Samuelson | S. S. | 4141 Elm St. |
| Benjamin | Benjamin | B. B. | 4242 Oak St. |
| Moses | Moses | M. M. | 4343 Pine St. |
| David | Davidson | D. D. | 4444 Cedar St. |
| John | Johnston | J. J. | 4545 Birch St. |
| William | Williamson | W. W. | 4646 Spruce St. |
| Charles | Charles | C. C. | 4747 Willow St. |
| Thomas | Thomas | T. T. | 4848 Ash St. |
| Richard | Richardson | R. R. | 4949 Hickory St. |
| Joseph | Josephson | J. J. | 5050 Sycamore St. |
| Henry | Henry | H. H. | 5151 Magnolia St. |
| George | George | G. G. | 5252 Poplar St. |
| Edward | Edwards | E. E. | 5353 Chestnut St. |
| Frank | Franklin | F. F. | 5454 Walnut St. |
| Albert | Albertson | A. A. | 5555 Elm St. |
| Samuel | Samuelson | S. S. | 5656 Oak St. |
| Benjamin | Benjamin | B. B. | 5757 Pine St. |
| Moses | Moses | M. M. | 5858 Cedar St. |
| David | Davidson | D. D. | 5959 Birch St. |
| John | Johnston | J. J. | 6060 Spruce St. |
| William | Williamson | W. W. | 6161 Willow St. |
| Charles | Charles | C. C. | 6262 Ash St. |
| Thomas | Thomas | T. T. | 6363 Hickory St. |
| Richard | Richardson | R. R. | 6464 Sycamore St. |
| Joseph | Josephson | J. J. | 6565 Magnolia St. |
| Henry | Henry | H. H. | 6666 Poplar St. |
| George | George | G. G. | 6767 Chestnut St. |
| Edward | Edwards | E. E. | 6868 Walnut St. |
| Frank | Franklin | F. F. | 6969 Elm St. |
| Albert | Albertson | A. A. | 7070 Oak St. |
| Samuel | Samuelson | S. S. | 7171 Pine St. |
| Benjamin | Benjamin | B. B. | 7272 Cedar St. |
| Moses | Moses | M. M. | 7373 Birch St. |
| David | Davidson | D. D. | 7474 Spruce St. |
| John | Johnston | J. J. | 7575 Willow St. |
| William | Williamson | W. W. | 7676 Ash St. |
| Charles | Charles | C. C. | 7777 Hickory St. |
| Thomas | Thomas | T. T. | 7878 Sycamore St. |
| Richard | Richardson | R. R. | 7979 Magnolia St. |
| Joseph | Josephson | J. J. | 8080 Poplar St. |
| Henry | Henry | H. H. | 8181 Chestnut St. |
| George | George | G. G. | 8282 Walnut St. |
| Edward | Edwards | E. E. | 8383 Elm St. |
| Frank | Franklin | F. F. | 8484 Oak St. |
| Albert | Albertson | A. A. | 8585 Pine St. |
| Samuel | Samuelson | S. S. | 8686 Cedar St. |
| Benjamin | Benjamin | B. B. | 8787 Birch St. |
| Moses | Moses | M. M. | 8888 Spruce St. |
| David | Davidson | D. D. | 8989 Willow St. |
| John | Johnston | J. J. | 9090 Ash St. |
| William | Williamson | W. W. | 9191 Hickory St. |
| Charles | Charles | C. C. | 9292 Sycamore St. |
| Thomas | Thomas | T. T. | 9393 Magnolia St. |
| Richard | Richardson | R. R. | 9494 Poplar St. |
| Joseph | Josephson | J. J. | 9595 Chestnut St. |
| Henry | Henry | H. H. | 9696 Walnut St. |
| George | George | G. G. | 9797 Elm St. |
| Edward | Edwards | E. E. | 9898 Oak St. |
| Frank | Franklin | F. F. | 9999 Pine St. |
| Albert | Albertson | A. A. | 10000 Cedar St. |

The above list is a list of the names of the persons who

are listed in the following table, and the names of the persons who are listed in the following table are listed in the following table.

The above list is a list of the names of the persons who

The following table will give the average analyses for the
for the feeds used;

| Feed | Moisture | Ash | Fat | Protein | Nitrogen
Free Extract | Fiber |
|-------------|----------|-------|-------|---------|--------------------------|-------|
| Corn | 11.40 | 1.85 | 4.25 | 9.69 | 69.31 | 3.50 |
| Rice Polish | 8.40 | 6.42 | 11.59 | 12.03 | 57.40 | 4.15 |
| Rice Bran | 7.52 | 7.60 | 15.65 | 15.16 | 46.80 | 7.26 |
| Tankage | 7.25 | 15.97 | 8.66 | 62.53 | 3.65 | 1.92 |

From the analyses of the rice by-products that have been used in the various tests at the Mississippi Station, it is evident that there is considerable variation in the feeding value of these products.

Mr. Russell: Are there any questions?

Mr. Quesenberry: We got as good results starting hogs at 44 pounds as when we used 68 pound pigs. We had trouble in the rice by-product lot with the hogs becoming crippled. There was one pig last year that was practically paralyzed in his hind quarters. There was just one pig in the brewers' rice lot.

Mr. Martin: We had one pig at the end of 8 weeks that was entirely down in the rice polish lot. We fed this hog cod liver oil and mineral and got it on its feet within two weeks.

Mr. Russell: Mr. Ellis will now report on an experiment we carried on at Beltsville with Brewers' rice.

Mr. Ellis:

Brewers' Rice Experiment

The object of this experiment was to study the effect of a low fat ration upon fat formation from the standpoint of quantity as well as quality of fat. The basal feed was brewers' rice, which usually contains less than 1 per cent of fat. The plan of the experiment in general paralleled that on corn feeding which was reported in Department Bulletin 1407 and in the Journal of Biological Chemistry, November 1925. The pigs were fed individually after weaning, and periodic killings made at 20, 40, 70, 110, 170, 225 and 275 pound weights. Two pigs were killed at each weight excepting the last named when only one was killed. Carcass analyses were made on each pig. Study of the composition of the fat from the standpoint of fatty acid content is under way. In addition, study has been made of the composition of the fat in the blood, liver, and other organs. The growth and feeding data as prepared by Mr. Zeller follows:

On January 6, 1925 an experiment was started at the U. S. Experiment Farm, Beltsville, Md. to determine the effect of a brewers' rice ration upon the character of the hog carcass at slaughter.

Two bred sows (1 Duroc Jersey and 1 Chester-White) were put on a ration of 85 parts brewers' rice, 10 parts alfalfa meal and 5 parts bloodmeal. The ration was mixed and fed in a self-feeder. At the start of the test the sows were in rather thin condition. The Duroc sow weighed 276 pounds on January 6. The sows were self-fed on the above mentioned mixture from January 6 to February 11, during which time they consumed 1025 pounds of the feed mixture and 30 pounds of the following mineral mixture; 75 pounds charcoal, 6 pounds of common salt, 6 pounds Glaubers salt, 3 pounds raw rock phosphate, 6 pounds of ground limestone, 3 pounds flowers of sulphur and 1 pound of pulverized copperas. From February 11, the sows were hand fed the above mixture until farrowing time during which period they consumed 1613 pounds of the brewers' rice mixture. The two sows farrowed 18 pigs, 17 of which were weaned. Of these, 13 were used in the experiment.

During the suckling period the sows and their litters were hand fed the same mixture and consumed 1747 pounds of feed.

After weaning the pigs of these litters were hand fed individually. The following table shows the feed consumption for the individual pigs from weaning until they were slaughtered. The mineral mixture used in the ration from weaning to slaughter is as follows: 10 pounds Rock Phosphate 5 pounds ground limestone and 1 pound common salt.

Feeding and growth record of pigs from weaning to slaughter.

| No. of hog. | Days on test | Feed consumed per 100 lbs. gain | Final Wt. | Gain from weaning | Average daily gain |
|-------------|--------------|---------------------------------|-----------|-------------------|--------------------|
| 18.7 | 37 | 267.4 | 75 | 33 | .89 |
| 52.7 | 25 | 333.9 | 75 | 14 | .56 |
| 18.6 | 60 | 265.5 | 110 | 63 | 1.05 |
| 52.8 | 60 | 288.4 | 110 | 58 | .97 |
| 18-3 | 131 | 395.6 | 166 | 131 | 1.00 |
| 52-1 | 114 | 377.0 | 170 | 112 | .98 |
| 18-4 | 171 | 373.9 | 253 | 214 | 1.25 |
| 18-8 | 171 | 385.3 | 246 | 209 | 1.22 |
| 52-6 | 171 | 331.2 | 299 | 243 | 1.42 |

Information on the firmness of the carcasses and the composition of the fat is given in the following table.

| Pig No. | Wt. at Slaughter | Grade | R. I. "Meat" | I. No. Fat | % fat of analyzed weight |
|---------|------------------|-------|--------------|------------|--------------------------|
| 18-2 | 18 | ... | 1.4591 | 63.6 | 13.6 |
| 52-4 | 23 | ... | 1.4593 | 65.7 | 17.0 |
| 18-5 | 29 | ... | 1.4591 | 66.1 | 14.2 |
| 52-2 | 41 | ... | 1.4591 | 64.9 | 20.6 |
| 52-7 | 73 | M-S | 1.4590 | 61.2 | 25.1 |
| 18-7 | 73 | M-S | 1.4588 | 56.5 | 21.6 |
| 18-6 | 110 | M-H | 1.4584 | 57.4 | 25.6 |
| 52-8 | 110 | H | 1.4582 | 54.3 | 28.9 |
| 52-1 | 170 | H | 1.4589 | 57.6 | 38.2 |
| 18-3 | 166 | H | 1.4583 | 55.6 | 39.5 |
| 18-4 | 243 | H | 1.4584 | 53.3 | 39.4 |
| 18-8 | 244 | H | 1.4588 | 57.4 | 37.7 |
| 52-6 | 282 | H | 1.4584 | 55.1 | 44.9 |

The information on firmness of the fat indicates that it was considerably harder at all periods than for similar conditions in corn feeding. The young weanling pigs contained fat with essentially the same refractive index and iodine number as usually found in mature corn fed hogs.

The change in fat composition toward greater hardness was not as marked as observed in the progressive hardening on corn. The small amount of oil which was ingested on the ration of brewers' rice and supplements may have caused some softening of the body fat. However the body fat is very largely the product of synthesis from carbohydrates. It is evident that the fat in the small pigs (under 100 pounds) was hard because of the absence of softening feed fats. Because of the relatively low rate of fat formation in young pigs there is greater opportunity for feed fat to alter the composition of the body fat synthesized from carbohydrates.

The work on fatty acid analysis of the fat samples from the hogs is still incomplete and cannot be reported now.

Mr. Russell: Are there any questions? There was one interesting side light to me in this experiment. Mr. Ellis told us that these sows were thin but when put on brewers' rice they about doubled their weight during the gestation period. We did not have much space for them but these pigs at farrowing time were the liveliest best pigs I ever saw. It was more the vigor the little fellows had.

Mr. Quesenberry:

Did you have good sized litters?

Mr. Ellis:

Yes, we had 13 killed in experiment and 3 or 4 more turned into the herd. I know one pig was considered to be a runt and we threw him over into the general herd and he went up to 300 pounds and over, ahead of the rest of the other pigs.

Mr. Russell: Are there any questions?

Mr. Hankins have you a summary of this?

Mr. Hankins: It is hardly necessary to do much summarizing here on this line of work. You men have probably all been over the manuscript by this time and noticed figures 7 and 8 which illustrate the hardening of rice polish fed hogs. Consequently you are no doubt already familiar with the summarized results. I might call your attention here to the difference in results from hardening on brewers' rice as compared with corn by putting these two charts up side by side.

Mr. Hankins: Mr. Ellis has something in the way of a report on hardening after rice bran.

Mr. Ellis:

Rice bran followed by (a) corn (b) brewers' rice.

The summary of firmness results on hogs fed rice bran followed by corn and tankage is necessarily brief and incomplete. Complete data are available on 26 hogs from Mississippi 1924, Iberia 1925 and Arkansas 1925. Additional experiments are just completed or still in progress at these stations and the data from the hogs in these experiments may materially alter the results.

Summary of the 26 hogs follows:

| No. hogs | Grading | Initial Wt. | Gain | | Days fed | | SI Wt. | R. I |
|----------|-------------------------------|-------------|------|------|----------|------|--------|------|
| | | | Bran | Corn | Bran | Corn | | Back |
| 26 | 14 H
6 M-H
5 M-S
1 S | 76 | 44 | 105 | 53 | 59 | 211 | 1.45 |

An even smaller number of hogs are available on the feeding of brewers' rice following rice bran but additional results will be forthcoming very shortly. Results on 13 hogs show weights, gains, and feeding periods comparable to those on bran followed by corn. However, the refractive index was 3 points lower (1.4594) and the grades were 8-H, 1 M-H, 2 M-S, 2-S.

Mr. Halverson: What is the fat content of the rice bran?

Mr. Ellis: The samples of the brans used ran something over 12 per cent.

Mr. Russell: Are there any questions?

That concludes our work with rice by-products. I think I reported at the last meeting that we were taking up with the California station some work which had to do with continuous feeding of green alfalfa. Along the Pacific coast we have had some complaints from the packers of what they called alfalfa fed or soft hogs. The California station happens to be the only one in the United States that is so fixed that they can practically count on green pasture all the time. Their climatic conditions are such that they can grow green feed all the year. This experiment was started by selecting a bunch of sows and putting them on pasture at breeding time and carrying them through gestation. There was a bunch of pigs killed last year. They were not graded in the ordinary way due to the fact that it was impossible to go out there at the time they were slaughtered. Fat samples were taken and Mr. Ellis made the findings in that way. I do not know how many sows are bred to farrow pigs for this work this spring. So, from next year on, the dams of the pigs raised will have been on green alfalfa always from the time their dams were bred on through.

Mr. Hughes made a report of the work during the past year which will be read. It is the intention to have the grading made in the regular way this fall. We will see that they are as nearly as possible under the same conditions as the carcasses at Beltsville.

Mr. Hankins, will you give us Mr. Hughes' report of this work?

Mr. Hankins:

In November, 1924, four purebred Poland China and four purebred Duroc-Jersey sows were bred for March farrow and were placed on alfalfa pasture and kept there until they farrowed. During the gestation period these sows were fed rolled barley and tankage in the proportion of 20 parts of rolled barley to one part of tankage by weight. The condition of the sows determined the amount of feed that was fed. It was our plan that they should gain about three-fourths of a pound per head daily from the time that they were bred until they farrowed their litters.

One of the Duroc-Jersey sows, No. 66, farrowed somewhat earlier than the others. From March 6th to March 24th, inclusive, the sows were fed barley and bran. From the 25th of March until the pigs were weaned on May 8th, the sows were fed a mixture of equal parts of wheat bran and barley to which was added five per cent of tankage. That is, the proportions were 10 pounds of rolled barley, 10 pounds of wheat bran and one pound of tankage by weight. A mixture of whole barley and wheat middlings, 10 pounds each, and one pound of tankage was also placed in separate self-feeders for the little pigs. These self-feeders were placed in creeps where the old sows were not allowed to run.

On the 31st of March the pigs from the Duroc-Jersey sow No. 66 were taken off the experiment because they ran temperatures. They were vaccinated on the 2d of April and in a short time one or two died from bad cases of necrotic enteritis.

On April 9th the mixture fed the small pigs was changed to the following: 10 pounds wheat bran, 40 pounds wheat middlings, and 25 pounds barley. This was mixed and placed in a self-feeder.

On April 22d the pigs were all vaccinated and on the 8th of May the pigs were weaned and placed in a barn for a day or two, after which they were again placed on alfalfa pasture. During the period between the time the pigs were weaned and the time they were put on test on June 4th, they were fed a mixture of 10 pounds wheat bran, 40 pounds wheat middlings and 25 pounds rolled barley, plus alfalfa pasture.

On June 3d, 4th and 5th the pigs were weighed consecutively and were put on a ration of rolled barley and tankage and were self-fed on alfalfa pasture. The Poland-Chinas and Duroc-Jerseys were put in separate fields. On June 6th pasture became scarce and both lots of pigs were fed some green alfalfa each day.

On July 16th some of the pigs were wormed and on the 18th of July the Poland-Chinas and Duroc-Jerseys were placed together in one large pasture. They were kept together and weighed each week until the close of the test which was September 24th.

The feeding period from June 4, 1925, to September 24, 1925, covered a period of 112 days. The number of pigs placed on feed June 4th was 55. Thirteen pigs were taken off the test for one reason or another, which left a total of 42 that finished.

The total feed consumed was 24,462 pounds of barley and 718 pounds of tankage. The total pounds of gain by all the pigs was 6,129.33. The average initial weight was 51.406. The average final weight of the 42 that finished was 190.206 pounds. The total feed consumed per 100 pounds gain was 399.09 pounds of barley and 11.7 pounds of tankage.

The hogs were shipped to Dixon on the 27th day of September by truck, a distance of 11 miles. These pigs were sold at 20 cents per pound dressed weight. September 28th the hogs were killed. The weights of the carcasses were taken with the head on and leaf fat in, and samples of the back and leaf fat were taken on the 29th of September.

Mr. Russell: After reporting the findings to Mr. Hughes I had a letter from him in which he said he was very much interested in the gradings of the Duroc and Poland China hogs. The Duroc Jerseys graded with an average refractive index of 1.4594, and the Poland Chinas with an average refractive index of 1.4598. He said he was going to be more than interested in what we get out of it this year.

Are there any questions?

The only other piece of experimental work is a report on what for want of a better name we call heredity work. Mr. Hostetler and the Beltsville Station are doing something along this line. We were wondering whether there might be some effect on the quality of pork produced by the feeds during the gestation period and prior to breeding. The test was planned to take sow pigs at weaning time and put them on a ration including peanuts, middlings, and pasture when available, and breed the sows when about 8 or 9 months old. We carried them on peanuts up to farrowing time. The day they farrowed we changed the feed and gave them corn, middlings, tankage, etc. The sows were fed that way during the suckling period and the pigs were weaned and fattened on corn, middlings, etc. The hogs were killed and gradings made.

Mr. Hankins will now report on the Beltsville work.

Mr. Hankins: Last year we reported everything that had been done including Mr. Hostetler's text. Since that time we had had one experiment composed of one litter of pigs. These pigs were slaughtered last fall, in October. They were spring pigs and they killed at an average final weight of 208 pounds with an average refractive index of 1.4598 and with an average grading of medium hard. One graded hard, three medium hard, one medium soft and one soft. As a general average of all of these hogs we get a medium soft grading, an average refractive index of 1.4602 with an average final weight of 202 pounds. This represents 30 hogs. The following table gives a summary of data by experiments:

| Experiment | Average daily gain
birth to final wt. | Ave. grading | Ave refractive
index
Back fat | Ave. fi
wt. |
|------------|------------------------------------------|--------------|-------------------------------------|----------------|
| 1 | .66 | S | 1.4607 | 203 |
| 2 | .85 | H-MH | 1.4592 | 221 |
| 3 | 1.02 | MS | 1.4599 | 200 |
| 4 | .94 | MH | 1.4598 | 208 |
| 5 | .86 | MS-S | 1.4599 | 154 |

Mr. Russell: We certainly have had all kinds of difficulties in connection with this work. The first group of sows that were developed on peanuts farrowed fairly good litters. They did rather well in number of pigs farrowed. The pigs, however, were not thrifty. In the second group of litters we got practically nothing. Some sows that did farrow lost their pigs and other aborted. During the past winter we fed some tankage along with the middlings with the hope of better results in our spring litters.

We could buy shelled peanuts cheaper than nuts in the shell, so fed them during one growing and gestation period with very unsatisfactory results. We thought possibly the trouble might be with the shelled nuts, so we selected 8 sows pigs in the spring of 1925, dividing them into 2 lots of 3 each. In one lot shelled nuts were fed while in the other nuts in the hull were used. The results have been that in the lot receiving nuts in the shell one was bred but never settled in pig, one farrowed 8 pigs and has 7 and the other farrowed 12 and saved 9 good pigs. In the lot receiving shelled nuts one farrowed 5 weak pigs and all died, one farrowed 2 and has 1 and the other farrowed 10 which are now only a week old but all alive. This would seem to indicate that the feeding of shelled nuts did not cause the trouble.

Mr. Hostetler: In that peanut feeding of the sows did you supplement peanuts in any way except with pasture?

Mr. Hankins: Yes, We gave them middlings and this past year we fed tankage.

Mr. Robison: Did you have minerals along with tankage that period?

Mr. Hankins: We have used minerals all the way through.

Mr. Hostetler: The sows were on pasture during the gestation period were they not?

Mr. Hankins: Yes, whenever pasture was available.

Mr. Russell: We can not help but think from the results that there is some influence there and it seems to us that work is necessary in this line. We are going to go on with it and it is certainly not encouraging to any of you gentlemen after what we told you of the time we had with the sows. One farrowing season we bred 8 sows and got 2 litters. Last year we had just one litter out of 8 sows.

Mr. Robison: That would indicate a deficiency in the ration.

Mr. Russell: We are going to start some work, developing the sows on brewers rice, which produces very hard carcasses. We will carry these sows on brewers rice until they farrow, then change them over to corn, middlings and tankage and fatten their pigs on the same feeds. The object is to see if we get hogs that will be noticeably harder than hogs whose dams are fed in the ordinary way from weaning to farrowing.

We would be pleased to have any of our cooperating stations take up this work and develop the sows either on brewers' rice or on peanuts. There is no question in our minds that the work is important and we must know what influence, if any, the feeds given the sow during gestation have on the quality of the pork produced by the litter.

Mr. Martin: We have been feeding a lot of rice polish to our sows during this past season and we have gotten very excellent results in farrowing litters.

Mr. Russell: You take your case Mr. Martin. You carried your sows through on rice polish during the gestation period and got good results at farrowing.

Our tests at Beltsville indicate that the feeding of softening feeds during gestation may influence the quality of pork in the pigs from these sows. May it not have a softening effect on the pigs produced and thereby effect the experiment on which the pigs are placed? It seems to me we have quite a problem to solve. We got some letters from hog men saying the packers report that their hogs killed soft and that these hogs never had any peanuts or softening feeds. The small amount of work we have done in this line indicates that the feeds during gestation may be the cause.

Mr. Durant: I wonder what effect they would have if the sows ran on soybean fields?

Mr. Russell: This would probably depend on the stand of the soybeans in the fields. If they are well scattered I do not think it would have any effect. However, we may find out differently.

Dr. Jacob: It may have its influence on the shipment of southern feeders into the corn belt.

Mr. Vestal:

We have sent in pigs where dams were fed soybeans and minerals during the gestation period. The sows and the pigs were fed soybeans and mineral during the suckling period. They had soybeans up to the time they were sent in. The first time we sent three 10 or 11 months old. They killed medium hard. Last year we sent in a litter of 11 pigs. They were fattened on corn, soybeans, and mineral from the time they weighed 100 pounds. Their dams had corn, soybeans, and mineral during gestation with a little shorts about up to weaning time. From weaning time they had corn, soybeans, mineral, tankage, and shorts. These pigs killed harder than some pigs that were fed on corn, soybeans and mineral started at 63 pound weight. These pigs started at 63 pounds weight were mostly pigs whose dams had been fed corn, oats and tankage. It seems that the pigs which have soybeans are apt to be harder than those just finished on corn and soybeans.

Mr. Russell: We have not enough data to know anything. If we could get these sows to farrow pigs and raise them we should get something but we did not get the pigs. The first year we had 6 sows out of 8 that carried their pigs and farrowed them. Last year we only got three out of eight.

Mr. Hankins: We had a very interesting occurrence with the second group. One sow died. She was almost ready to farrow but without any indication of sickness she simply laid down and died. Dr. Buckley made a postmortem examination and the only thing in the world we could find abnormal was a ruptured heart. It was very thin walled and flabby. We, of course, wondered whether the feed was responsible.

Mr. Edwards: What kind of feed did she have?

Mr. Hankins: She had peanuts, middlings and minerals.

Mr. Russell: We might be censored for the way we handled these sows. It was necessary for us to keep them in lots of about one-half acre in size and sometimes without pasture. We all know that a sow should have more room than

that during gestation. We had some sows in some vitamine tests at Beltsville that are kept in the same size lots and almost always have had good litters.

Dr. Jacob: Have you had any infectious abortion?

Mr. Russell: We have had abortions at different times and have had the Pathological people out and have never found any indication of contagious abortion. We have been fortunate that it has not occurred.

It has been our custom to have Mr. Ellis report the results of the chemical tests he has made and we will hear from him at this time.

Mr. Ellis:

Report on laboratory work not covered in reports and summaries already given.

1. Fat formation study on pigs started on peanuts at weights of 40 pounds, fed peanuts 8 weeks and then corn and tankage for 20 weeks. This experiment was started a year ago but was discontinued on account of the cholera outbreak. It has been resumed this spring. Carcass analysis and study of the fatty acid composition of the body fats is being made. Killings are made (1) at close of peanut feeding, and at 4 week intervals thereafter. Hogs analyzed from the hardening period are chosen to represent gain on corn of 2, 3, 4 and 5 times the peanut gain.

2. Analytical work on fat constants.

The total number of hogs from which fat samples have been taken during the past year numbers about 950. The number of refractive index determinations on the preliminary sample and the final back and leaf samples is approximately 3 times this number or 2850. Iodine numbers have been run on 400 samples of back fat. A considerable number of these are from previous years' experiments. Dr. Dahl has done most of the work just described.

3. Mr. Dahl has started some work on the general question of rancidity (1) how rancidity and other factors affect the determination of the refractive index, iodine number and other fat constants.

(2) the keeping qualities of hard and soft lards and meats.

4. Besides work on the preparation of the bulletins, two papers have been prepared on the effects of feeds upon the fat and fatty acid composition of lards. These papers have recently been submitted for publication and should appear during the summer. The reprints sent you some time ago were from a paper published in the Journal of Biological Chemistry, November 1925. There is more work completed which should be written up for publication during the coming year..

5. There is a considerable amount of fat analysis work under way or planned relative to the brewers' rice experiment and to rations which have been the subject of experiments during the past two years. It is hoped to get information on the changes in the fatty acid composition on all the more important lines of softening and hardening combinations which are under investigation.

6. Analyses of feed samples are made for us by the Bureau of Chemistry. It has been thought desirable to include the results of analyses in this report. The two following tables give the results for (1) the year 1924-25 and for (2) the year 1925-26.

Feed Samples From Soft Pork Experiments For Year 1924-25 - Analyses by Bureau of Chemistry.

| Feed: | Station | Sample No. | Moisture | Ash | Ether Extract | Protein | Crude Fiber | Nitrogen |
|----------------|-----------------|------------|----------|-------|---------------|---------|-------------|----------|
| Corn - yellow: | Beltsville | 401 | 13.15 | 1.21 | 3.56 | 8.83 | 1.73 | 71.47 |
| " - mixed: | McNeil | 416 | 12.04 | 1.24 | 4.44 | 9.13 | 1.92 | 71.23 |
| " - yellow: | Beltsville | 426 | 14.33 | 1.35 | 3.53 | 7.25 | 2.06 | 70.48 |
| Tankage | | | | | | | | |
| " - " | Beltsville | 403 | 9.08 | 21.77 | 5.11 | 61.56 | 1.26 | 1.22 |
| " - " | Iberia | 417 | 7.02 | 20.11 | 9.69 | 57.94 | 3.07 | 2.67 |
| " - " | Arkansas | 422 | 8.10 | 20.25 | 9.77 | 59.00 | 1.10 | 1.78 |
| Fishmeal-Fine: | McNeil | 413 | 8.80 | 21.60 | 2.28 | 53.38 | 3.37 | 5.57 |
| " - Coarse: | " | 414 | 8.29 | 21.03 | 2.05 | 54.75 | 8.94 | 4.94 |
| Middlings - | Beltsville | 405 | 10.64 | 4.38 | 5.66 | 18.06 | 6.08 | 55.18 |
| Bloodmeal | rice) | | | | | | | |
| Alfalfa | "(Brewers' | 430 | 15.01 | 6.36 | 0.25 | 79.00 | 0.63 | --- |
| | " " | 431 | 9.21 | 10.16 | 1.24 | 9.31 | 30.15 | 39.93 |
| Peanuts - | Beltsville | | | | | | | |
| " - | Shelled 9/8/24: | 402 | 4.90 | 5.73 | 36.30 | 26.25 | 2.49 | 24.33 |
| " - | Ga.-whole | 411 | 4.37 | 2.52 | 46.86 | 29.94 | 3.82 | 12.49 |
| Soybeans - | S. Car.-Mam.y. | 406 | 6.70 | 3.78 | 16.90 | 45.12 | 4.06 | 23.44 |
| " - | " - Biloxi | 409 | 6.21 | 4.58 | 17.30 | 42.19 | 4.86 | 24.86 |
| " - | Belt. - Va. | 407 | 6.56 | 4.83 | 18.50 | 35.19 | 5.58 | 29.34 |
| " - | " - Dry lot - | | | | | | | |
| | Mam.y. | 428 | 9.48 | 5.76 | 17.74 | 39.94 | 4.11 | 22.97 |
| Rice Polish | McNeil | 415 | 9.93 | 8.53 | 15.79 | 12.25 | 2.49 | 51.01 |
| " " | Ark. | 419 | 9.26 | 5.65 | 12.60 | 11.00 | 3.20 | 58.30 |
| Rice Bran | Iberia | 418 | 8.25 | 8.67 | 13.23 | 12.06 | 10.95 | 46.84 |

Table con't. on following page.

| Feed | Station | Sample No. | Moisture | Ash | Ether Extract | Protein | Crude Fiber | Nitrogen | |
|---------------|-----------------|------------|----------|-------|---------------|---------|-------------|----------|---------|
| | | | | | | | | Free | Extract |
| Rice Bran | - Ark. | 420 | 7.34 | 13.75 | 17.15 | 12.20 | 16.20 | 33.36 | |
| Brewers' Rice | - Ark. | 421 | 11.40 | 0.35 | 0.35 | 7.20 | 0.70 | 79.30 | |
| " | " - Belt. | 427 | 12.76 | 0.74 | 1.02 | 6.43 | 0.67 | 78.18 | |
| " | " - " (pigs) | 429 | 13.70 | .72 | .54 | 7.19 | 0.46 | 77.39 | |
| Peanut meal | - Belt. "Primo" | 425 | 7.19 | 7.51 | 9.44 | 31.00 | 19.03 | 25.83 | |

| Feed | Station | Sample No. | Moisture | Ash | Ether Extract | Protein | Crude Fiber | Nitrogen
:Free
:Extract |
|-----------|-------------------------|------------|----------|-------|---------------|---------|-------------|-------------------------------|
| Corn - | Belt (Nov.) | 507 | 9.32 | 1.33 | 3.56 | 8.75 | 2.53 | 74.21 |
| " | " (soybean field) | 510 | 14.22 | 1.54 | 3.16 | 8.94 | 2.09 | 70.05 |
| " | Ca. spring 1925 | 519 | 7.13 | 1.63 | 4.38 | 11.75 | 2.69 | 72.42 |
| " | Va. - Fall 1925 | 539 | 12.02 | 1.40 | 4.11 | 9.38 | 2.56 | 70.75 |
| " | Belt. (Feb.) | 542 | 15.36 | 1.28 | 3.93 | 8.13 | * | * |
| " | Iberia | 543 | 9.21 | 1.35 | 4.50 | 9.19 | * | * |
| " | Ark. | 549 | 12.83 | 1.26 | 4.42 | 10.38 | * | * |
| Tenlake - | Ga. spring 1925, | 518 | 5.64 | 19.03 | 9.13 | 64.03 | 1.20 | 0.97 |
| " | - Cal. | 531 | 6.99 | 22.17 | 4.26 | * | 1.48 | * |
| " | - Ark. | 548 | 12.05 | 21.83 | 7.77 | 55.00 | * | * |
| Peanuts - | Belt. Shelled: 7/2/25 | 509 | 5.98 | 2.30 | 37.97 | 27.50 | 2.44 | 23.81 |
| " | Ga. nuts 77.5% | 532 | 4.18 | 2.28 | 46.71 | 30.41 | 2.77 | 13.65 |
| " | - Blet. shelled: 1/6/26 | 533 | 6.64 | 2.60 | 36.35 | 27.41 | 2.64 | 24.36 |
| " | " : nuts 67.0% | 534 | 4.34 | 2.83 | 43.05 | 26.35 | 3.19 | 20.69 |
| " | " " 74.5% | 535 | 3.94 | 2.48 | 46.80 | 28.72 | 5.53 | 12.53 |
| " | Va. (1) " 72.7% | 536 | 5.46 | 2.40 | 44.64 | 30.36 | 2.63 | 14.51 |
| " | " (2) 63.1% | 537 | 5.36 | 2.70 | 42.70 | 29.75 | 2.59 | 17.30 |
| " | " (3) 73.2% | 538 | 5.07 | 2.38 | 48.14 | 26.53 | 2.35 | 15.53 |
| Soybeans: | Belt. dry lot, mixed | 515 | 5.54 | 5.25 | 19.61 | 38.19 | 3.19 | 28.22 |
| " | " seed Wilson | 511 | 6.62 | 5.27 | 16.69 | 36.81 | 5.29 | 29.32 |
| " | " " Morse | 512 | 6.06 | 5.13 | 19.80 | 36.19 | 4.66 | 28.16 |
| " | " " Haberlant | 513 | 5.88 | 5.13 | 19.18 | 35.69 | 4.52 | 29.60 |
| " | " " Va. | 514 | 6.18 | 5.52 | 16.63 | 35.69 | 5.37 | 28.41 |
| " | " crop. Wilson | 526 | 6.61 | 4.15 | 16.00 | 42.81 | 5.04 | 25.39 |
| " | " " Morse | 527 | 6.35 | 4.93 | 18.97 | 40.44 | 4.45 | 24.86 |
| " | " " Haberlant | 528 | 6.48 | 4.68 | 18.41 | 39.56 | 5.29 | 25.58 |
| " | " " Va. | 529 | 6.25 | 5.13 | 13.69 | 39.22 | 4.68 | 26.03 |
| " | S. Car. Haberlant 38: | 520 | 6.19 | 4.90 | 13.08 | 44.47 | 4.55 | 21.81 |

Table con't. on following page.

| Feed | Station | Sample No. | Moisture | Ash | Ether Extract | Protein | Crude Fiber | Nitrogen Free Extract |
|----------------|-----------------|------------|----------|-------|---------------|---------|-------------|-----------------------|
| Soybeans | S. Car. Mam. y. | 521 | 6.10 | 4.75 | 19.81 | 44.81 | 4.74 | 19.79 |
| " | Va. - mixed | 540 | 8.70 | 4.70 | 19.15 | 39.50 | * | * |
| Barley | Cal. | 530 | 9.45 | 2.78 | 2.02 | 8.16 | 6.36 | 71.23 |
| Rice Polish | Ark. | 546 | 10.29 | 7.68 | 13.59 | 12.06 | * | * |
| Rice Bran | Iberia | 544 | 6.96 | 10.14 | 13.65 | 3.69 | * | * |
| " | Ark. | 547 | 8.82 | 13.89 | 11.70 | 12.63 | * | * |
| Brewers' Rice | Belt. | 508 | 9.58 | 0.83 | 0.52 | 7.06 | 0.77 | 81.24 |
| " | Ga. spring '25 | 517 | 10.78 | .73 | .59 | 7.22 | .43 | 80.25 |
| " | Iberia | 545 | 9.60 | .70 | 1.04 | 7.06 | * | * |
| " | Ark. | 550 | 13.29 | .74 | .90 | 7.19 | * | * |
| Sweet potatoes | Va. | 541 | 65.27 | .80 | .40 | 2.04 | * | * |

✓ This refers to percentage nuts of whole peanut. All analyses of peanuts are on shelled nuts.

* Analysis incomplete

Mr. Russell: Are there any questions?

You gentlemen will recall that in the general work of the investigation that the Institute of American Meat Packers are a part. They have given us a helping hand. The last two years Mr. Anderson has been with us but this year we have Dr. Moulton with us. We would be glad to hear from Dr. Moulton.

Dr. Moulton:

Remarks at Soft and Oily Hog Conference

I fear I have nothing of value to add to the interesting and instructive presentation and discussion which has been taking place these past two days. My contact with this work in the past has been through the literature and reports. So I have learned much by direct contact with those responsible for the work accomplished.

You may be interested in the further progress of the work done by Dr. William E. Anderson at Yale University on the soft and oily hog problem. Since his last report to you some interesting results have been obtained. The hardening effect of starch and protein had been shown and also the difficulty of hardening rats after the use of the softening oils. When diets containing 30 per cent, or even as low as 15 per cent. of the energy of the ration in the form of softening fat were fed soft fats resulted. However, when coconut oil and soy bean oil were used in equal parts along with skim milk, a fat much nearer normal was produced. Although the coconut oil is an oil it is very low in unsaturated fatty acids, having an iodine number of 7.7. Therefore its liquid state must be due to the presence of shorter carbon chain fatty acids in the fats present. This would indicate that the animal can metabolize the lower fatty acids but cannot utilize well the higher unsaturated fatty acids, since the coconut oil forms a hard fat and soy bean oil a soft fat.

This raises the question of the value of a study of the fatty acids in the body fats and feed fats. Dr. Anderson is engaged in such a study and I am glad to hear that some such work is under way at the North Carolina station. Information derived in this manner may be necessary to explain the fact that sometimes the iodine number and the refractive index of the body fats do not run parallel as they apparently should.

More recent work at Yale has shown that feeding rats on a high corn oil ration up to 150 grams body weight and then starving them down to 120 grams followed by starch feeding up to 200 grams gives almost normal body fats. By making the weight 200 grams before the underfeeding period it has been easier to harden off the rat afterwards. In place of periods of starvation it is proposed to use very low calorie rations containing the other essentials of nutrition. There may be something of value here for the hog feeder.

It is my feeling that attention to the vitamin, mineral, and protein elements in the diet of the hog will help in the solution of our problems. An animal will perform to the full extent of its metabolic powers only

when these elements of the diet are adequately provided for. More experiment which take this into account would be desirable.

You may be interested to know that English bacon factories are also much concerned about soft oily bacon. I have before me a publication issued by Marsh and Baxter, Ltd., of Brierly Hill, Staffs, England, entitled, Soft and Oily Bacon, Its Cause and Prevention. According to this booklet this problem is solved largely due to work in their own factories. To quote from their pamphlet, their "opinion that excess of oil causes soft bacon is confirmed by evidence from other sources, though few direct investigations have been made on this subject".***** And continuing: "We shall deal, in this pamphlet, with the subject of excessively oily diet. This must not be taken to rule out the possibility that oily bacon may also arise on occasion through other causes."

This pamphlet goes on to give tables of the oil content of feeds and of the relative softening powers of the oils contained in them, and concludes with a method of calculating rations combining "foods to use with care" and "foods which will not cause oily bacon." The former class includes: soybean meal, ground nut cake, maize gluten feed, brewers' grains, sharps, fine middlings, wheat bran, and maize. The latter group includes: blood meal, yeast, beans, peas, palm nut kernel extracted, wheat, rye, barley, grasses, tubers, and roots. It would appear that the English prefer a harder bacon than do we since maize is listed as a softening feed.

Dr. Moulton: I was wondering if where the committee gradings and refractive indexes do not agree if the trouble was with the cooler.

Mr. Russell: Where this grading committee works the pigs are all in the same cooler at the abattoir at Beltsville. We have pretty good control over it. I do not recall of it ever breaking down in any of the tests.

Mr. Hankins: Dr. Moulton, we originally held the carcasses 48 hours before we graded them. It was found that when we had a large number in the cooler it took longer to get the temperature down to the desired point so we extended our time to 72 hours before they were graded. We always try to grade at 34 degrees.

Dr. Moulton: Do you take the temperature of the meat itself?

Mr. Hankins: Yes, we have at various times, but it is not a regular practice.

Mr. Russell: Dr. Moulton I am mighty glad to have you with us and hope that you can come another year.

You gentlemen know that the committee appointed are to report in the morning on the work to be carried on during the next year and of course they have considerable material to go over yet but they also want to know as nearly as they can what particular line each station is in shape to take up. You know that the practice has been to make these assignments to the stations that can handle it in the most practical way.

There is one line I would like to take up and have some discussion on at this time and that is the question of corn and soybean feeding. It appears to us that the soybean problem is a real one. Our reports have shown some

decided differences in the quality of pork produced in this hogging-down system which is and is going to be the way the farmer is going to feed them to a considerable extent. The question of palatability naturally enters. That possibly and probably involves color and variety. We planned at Beltsville this year to do some hogging down work using the same four varieties of beans that we did last year. If we have the hogs plan on doing some dry lot work using the same variety of beans self fed free choice. That system of course would give us a better measure of the palatability of the four varieties that we will use. In these four varieties are four colors. It occurred to us that this is a valuable piece of work. Mr. Hammons was saying a little while ago that the committee would like to get some expressions on this. Can you who are doing soybean work do some dry lot feeding?

Mr. Robison: Would it be necessary to do that dry lot feeding work during the summer?

Mr. Russell: I do not know as it makes any difference when it is done. We are planning to do our work this summer. The hogging-down will be conducted with hogs say 125 pounds weight. If the quality of pork is not one of your main problems I do not see why the pigs could not be started right after weaning time to get a palatability test. The stations last year connected with the work were Alabama, McNeill, Miss., Ohio, Tennessee, Virginia and Beltsville. We took the matter up with Mr. Grimes of Pennsylvania and he said they expected to use 40 hogs in the hogging-down with 10 pigs as checks.

Mr. Durant: We are planning some hogging-down work at the station.

Mr. Russell: I think we could use these hogs. How many are you going to handle?

Mr. Durant: I think we will use about 40 or 50. There will probably be 30 head of pigs on soybeans.

Mr. Russell: I think it is quite valuable that we should have check lots on these hogs. Could you do any dry lot work Mr. Durant?

Mr. Durant: I do not think so. Most of our work for this year is hogging-down work.

Mr. Russell: How about you Mr. Salmon.

Mr. Salmon: I think we can do some hogging-down this year.

Mr. Russell: Where it is possible we should use different varieties. What is the consensus of the meeting on that?

Mr. Durant: In our work at Clemson College we plan to start on green soybeans and finish them on mature beans. I do not know whether our beans will hold out. We plan to start with an early variety and follow with a medium variety and then with a later one. It is always impossible to tell what the crops are going to be.

Mr. Salmon:

I wonder if a palatability test with different varieties with rats would not be worth attention?

Mr. Russell: I think it would have to be followed by hogs.

Mr. Ellis: I attempted a little of that with Virginia and Mammoth Yellow varieties but I did not get very far with it. I could not get anything out of it.

Mr. Russell: Mr. Templeton, are you figuring on doing some hogging-down?

Mr. Templeton: Yes we are if our conditions are right.

Mr. Russell: Could you figure on planting more than one variety?

Mr. Templeton: We can handle three varieties, the Mammoth Yellow, Laredo and Otootan.

Mr. Edwards: I would like to ask one question. Are these different kinds to be in different plots or are all varieties to be planted in one field and just watch the consumption of the beans.

Mr. Salmon: We had in mind planting in different plots and keeping the lots of hogs separated.

Mr. Russell: You mean to plant in our plot only one variety of beans?

Mr. Robison: Could not you tell fairly well what amount of pigs used?

Mr. Vestal: I could handle that in dry lot very well.

Dr. Jacob: I think in making a palatability test it should be made a little difficult for the hogs to get over from one plot to another. If you have them side by side the hogs just go from one side to another. I do not think that it is nearly so good as though they had to go through a gate to get them.

Mr. Russell: If we could select three or four varieties of beans with the same oil content is it reasonable to suppose you will get any difference in your carcass gradings?

Mr. Durant: Would you have to get beans that mature at the same time?

Mr. Russell: I think it should be as nearly as possible. At Beltsville we planted 8 rows of corn and 2 rows of one variety of beans, then 8 rows of corn and 2 rows of another variety of beans, etc.

Mr. Robison: We have been inclined to think that the palatability depends on the oil content of the bean.

Mr. Russell: If that is determined if we could get 2 or 3 varieties of the same oil content we would not have that trouble.

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Mr. Templeton: The size of the bean enters into it in our state.

Mr. Durant: In our state they recommend the use of Laredo for hay and the Biloxi and Mammoth Yellow for grazing.

Mr. Vestal: I think this variety test is one of the most important pieces of work in connection with soybeans. I would like to say that we could do some of this work this year. We have completed our hogging-off work and we would like to continue our soybeans on pasture. Depending on how the work under way now comes out we may want to continue with the different proportions experiment.

Mr. Russell: In that connection I do not think we have by any means completed the proportion work. By the way maybe some other station can do some work along this line.

Mr. Vestal: I would like very much to see that line of work carried out with different varieties of soybeans. Our work has been with Manchu's and yours has been with Virginias. I am confident that we have gotten softer hogs with Manchu's than with Hollybrook, Otootan or A.K's.

Mr. Russell: We need a couple of hundred head of hogs on one station to do that job.

Mr. Robison: What was your idea with regards feeding these hogs in dry lot?

Mr. Russell: My idea was to place the different varieties of beans in a separate compartment of a self-feeder or in separate self-feeders. Also have shelled corn and mineral in separate compartments. In this way the hogs will choose as between varieties of beans as well as corn and mineral.

Mr. Russell: We will now go on to the manuscript. I might state for the benefit of those who have not taken part in these meetings heretofore that a year ago the manuscript for this bulletin now completed was presented at this meeting. As I recall it we got the manuscript ready and mailed it out to the various members and they had a chance to go over it before they got here. It was taken up and discussed and a number of suggestions made for changes. Last year it was thought best to get out a second bulletin giving the results of the work since the first one was issued. We attempted to and thought we were going to succeed in getting this manuscript to you a week before this meeting. We were held up. We want to take up this whole question. Has there been anything left out? This has not been edited and has to go through our editorial office. You will notice it says prepared by Mr. Hankins, Mr. Ellis and Mr. Zeller. The work in our office had to take a little change in the past year. When the palatability-of-meat work was undertaken Mr. Sheets designated Mr. Hankins to oversee the records and other matters connected with the new project. In putting Mr. Hankins in this work it naturally took a great deal of his time so that Mr. Zeller, who has been with us for a good many years and who is in charge of the breeding and feeding work at the Beltsville Farm, was called into the office to take over a big part of the soft-pork records. He has helped some and I expect to a considerable extent in the preparation of this manuscript. The manuscript this time has been a piece of work by three men instead of two.

[illegible]

Mr. Hankins:

I would like to say just a word in this connection. We are very anxious to have you men satisfied with the way we do things in connection with the preparation of these manuscripts. I would like to ask your approval of using Mr. Zeller's name along with Mr. Ellis and mine as the committee on preparation of this manuscript. It is up to you. We do not want anything that does not meet with your approval. We would like to get the opinion of the meeting on this.

Motion made and seconded that Mr. Zeller's name be placed along with Mr. Hankins and Mr. Ellis as having prepared the manuscript for this second bulletin.

Mr. Russell: I just want to say in that connection that we appreciate that and I know Mr. Zeller will.

Mr. Hankins: I might explain that the first 7 pages of this manuscript are very similar to the introductory part of the first bulletin. In fact, I might say, the first 7 pages are more or less repetition of the introductory part of Department Bulletin 1407. I think, after having read the note on the first page of the manuscript, you will understand why we did that. We do not know if that plan will meet with the approval of our Editorial Office. If it does not meet with your approval we want you to tell us now. The rest of it is taken up as we did in the other publications, section by section, each of which is the development of a conclusion that has been agreed upon by this body, with the exception of a part of the last section on the hardening of rice-polish fed hogs. I am referring to that part which pertains to hardening of such hogs on brewers' rice. We agreed upon no conclusion of this kind but in studying the data we decided to work up the material for publication and to include it in this manuscript. This starts on page 40.

Mr. Durant: Will any new conclusions we draw be in this bulletin?

Mr. Hankins: I think it was the feeling of the committee that if it is possible to do that they should be included in this bulletin.

Mr. Durant: I was thinking in particular of these smaller pigs weighing less than 85 pounds on soybeans.

Mr. Hankins: I must take back what I said a moment ago that was that there is nothing included here except reports in detail on conclusions that had been agreed upon by this body except brewers' rice hardening of rice polish-fed hogs. There is the first section on the hardening of peanut-fed hogs on page 8 and on page 9. You will see the heading "Results from Heavier Pigs." It is on the hardening results from pigs with initial weight of 115 pounds and over. Our conclusions had covered weights of 85 to 114 pounds inclusive. In looking over the data we decided we would be justified in including the results from these heavier pigs.

Dr. Moulton: I have a suggestion to make regarding the titles on the various pages. In the bulletin you use a, b, and c to give the main sections. You

will do something of a service if you do likewise with this. I had a little difficulty in distinguishing the main sections. In fact it is rather difficult to distinguish the leading sections from the hardening sections.

Mr. Vestal: I would question the use of the word "Distasteful" in the fourth line of the first paragraph on page 1.

Mr. Hankins: Perhaps it is the wrong word. I confess to writing it and I did not use the word to convey the idea that the product is not palatable. I meant it as unattractive or not pleasing.

Mr. Russell: How does the word "unattractive" suit?

Mr. Salmon: I would like to question the desirability of putting this in the introduction.

Mr. Hankins: The only reason for doing so is given on the first page.

Mr. Salmon: Personally it seems to me that the statement on the first page is all that you need. The second bulletin is not worth very much to the person without the first bulletin. Since the rest of the introduction is more or less repetition of the matter contained in the first bulletin I just wonder if it is essential.

Dr. Moulton: I think that the introduction is very useful to one who is not following the soft pork problem as his chief interest. The introduction would help me very much to take it up and enjoy it and not have to read the first one.

Mr. Hankins: We felt we must have some background for the data given in this bulletin, so the person who does not have a copy of the first bulletin or who can not get a copy easily would have something of a background.

Dr. Jacob: I think these matters could all be safely left to a committee.

Mr. Salmon: There is really no data from our station in this bulletin. Our Director was very much hurt at the introduction calling attention to the inferiority of soft pork.

Mr. Edwards: I had some trouble with our Director with the discrimination against soft pork.

Mr. Hankins: The only reference in this manuscript to any undesirable feature of the soft products are on page 1, first paragraph, and in the latter part of the third paragraph. I would like to understand the criticism exactly, Mr. Salmon. Is it a question of thinking that the facts have not been stated or of not wanting to state the facts?

Mr. Salmon: I think it is largely a question of stating something that we have not proven as well as we have stated.

Mr. Hankins: What is in the first paragraph that is not a fact?

Mr. Salmon: Generally speaking their inferiority to firm hogs is recognized.

Let us consider the case of a function $f(x)$ which is continuous on the interval $[a, b]$ and has a finite limit at the endpoints a and b .

Let $\epsilon > 0$ be an arbitrary positive number. Since $f(x)$ is continuous on $[a, b]$, there exists a $\delta > 0$ such that for any $x, y \in [a, b]$ with $|x - y| < \delta$, we have $|f(x) - f(y)| < \epsilon$.

Let $\eta > 0$ be an arbitrary positive number. Since $f(x)$ has a finite limit at the endpoints a and b , there exists a $\delta_1 > 0$ such that for any $x \in [a, a + \delta_1]$, we have $|f(x) - f(a)| < \eta$.

Let $\delta_2 > 0$ be an arbitrary positive number. Since $f(x)$ has a finite limit at the endpoints a and b , there exists a $\delta_2 > 0$ such that for any $x \in [b - \delta_2, b]$, we have $|f(x) - f(b)| < \eta$.

Let $\delta_3 > 0$ be an arbitrary positive number. Since $f(x)$ is continuous on $[a, b]$, there exists a $\delta_3 > 0$ such that for any $x, y \in [a, b]$ with $|x - y| < \delta_3$, we have $|f(x) - f(y)| < \eta$.

Let $\delta_4 > 0$ be an arbitrary positive number. Since $f(x)$ is continuous on $[a, b]$, there exists a $\delta_4 > 0$ such that for any $x, y \in [a, b]$ with $|x - y| < \delta_4$, we have $|f(x) - f(y)| < \eta$.

Let $\delta_5 > 0$ be an arbitrary positive number. Since $f(x)$ is continuous on $[a, b]$, there exists a $\delta_5 > 0$ such that for any $x, y \in [a, b]$ with $|x - y| < \delta_5$, we have $|f(x) - f(y)| < \eta$.

Let $\delta_6 > 0$ be an arbitrary positive number. Since $f(x)$ is continuous on $[a, b]$, there exists a $\delta_6 > 0$ such that for any $x, y \in [a, b]$ with $|x - y| < \delta_6$, we have $|f(x) - f(y)| < \eta$.

Let $\delta_7 > 0$ be an arbitrary positive number. Since $f(x)$ is continuous on $[a, b]$, there exists a $\delta_7 > 0$ such that for any $x, y \in [a, b]$ with $|x - y| < \delta_7$, we have $|f(x) - f(y)| < \eta$.

Let $\delta_8 > 0$ be an arbitrary positive number. Since $f(x)$ is continuous on $[a, b]$, there exists a $\delta_8 > 0$ such that for any $x, y \in [a, b]$ with $|x - y| < \delta_8$, we have $|f(x) - f(y)| < \eta$.

Let $\delta_9 > 0$ be an arbitrary positive number. Since $f(x)$ is continuous on $[a, b]$, there exists a $\delta_9 > 0$ such that for any $x, y \in [a, b]$ with $|x - y| < \delta_9$, we have $|f(x) - f(y)| < \eta$.

Mr. Hankins: I certainly cannot agree with you.

Mr. Russell: I recall some discussion on the matter of wording last year and I do not know if there was any other wording agreed upon.

Mr. Edwards: As I remember there was no specific wording agreed upon. I believe it was suggested that it should be not taken too much for granted that soft pork was an inferior product.

Mr. Russell: From my standpoint it surely is an inferior product.

Dr. Jacob: It might be well to get an expression from this body of men whether or not soft pork has some undesirable criticisms.

Mr. Durant: The handling qualities are not desirable but the palatability is desirable.

Dr. Howe: I feel that there should be a study of palatability. I have had one or two experiences which I think were with soybean bacons which were not as good as the others. As far as my taste goes I would prefer a peanut ham to a corn fed ham every time.

Mr. Vestal: Based on our present standard of judging, soft pork is without question inferior. I think the question is whether our standards are right.

Dr. Halverson: I think we may come to the point in the next 5 or 10 years where you can produce soft or medium soft hams and bacons that will be very palatable so it may be well to be pretty careful.

Mr. Russell: We may come to that conclusion in the future. It might in some respects be a superior piece of meat.

Mr. Salmon: It is pretty hard to say what you mean by high and low quality.

Mr. Russell: Take the first paragraph on page 1, it is too late to discuss what has already been printed, but in this first paragraph in some way or another I can not see but what the statements there are facts. If they are not let us get them out and get some in that are facts.

Mr. Edwards: I think the facts are all right but it may be that the facts will change, in time that the peoples' tastes will change, that the Agricultural Colleges and Experiment Stations will put on some kind of a campaign to change peoples' tastes in pork.

Dr. Howe: How would it do to insert the word certain in place of "their" in the first line?

Dr. Moulton: I have another suggestion, in the second sentence, that you change the word "majority" to many.

Dr. Howe: I have another change. Leave out the first sentence. The product of soft pork have certain undesirable features.

Mr. Russell: As I get this our total suggestions agreed upon would be this. "The products of soft hogs have certain undesirable characteristics."

Mr. Salmon: I wonder if the last sentence could not be omitted. It does not seem to me that it adds much to the preceding sentence.

Mr. Templeton: It seems to me that the last sentence is the original sentence to follow that one.

Dr. Howe: Those two sentences could be combined. The relation of the proportion of fat to objectionableness is a statement and illustrate it with hams and lard.

Mr. Edwards: It seems to me that the first paragraph is largely covered in the third paragraph. I was wondering if we could not leave that first paragraph out.

Mr. Salmon: I would like to move that we omit the last sentence in the first paragraph. "Since most pork products contain a rather large proportion of fat most of them from a soft hog are objectionable."

Mr. Russell: Motion made and seconded that the last sentence in the first paragraph be omitted. Carried.

Motion has been made and seconded that the remaining part of the first paragraph read as follows:

"The products of soft hogs have certain undesirable characteristics. There is a lack of firmness in the fat which may be so extreme as to cause a typical soft, flaccid, shapeless condition in the products, which makes them inconvenient to handle and unattractive to many people. The hams are probably least and the lard most subject to criticism, depending upon the proportion of fat in the products." Carried.

Mr. Russell: What other suggestions have you?

Mr. Salmon: I would like to move that the word "decidedly" in the first paragraph at the top of page 2, the third line from the bottom of that paragraph be taken out and the sentence read as follows: "They hold their shape better, cut better and present a more attractive appearance than those from soft hogs."

Motion made and seconded that the word decidedly in the 6th line of the first paragraph be omitted. Carried.

Dr. Jacob: I make the motion that you leave out the last sentence at the bottom of page 2, first paragraph. "The housewife in buying discriminates consciously or unconsciously against the latter."

Mr. Russell: Motion made and seconded that the last sentence at the bottom of page 2, first paragraph be omitted. Carried.

Dr. Moulton: At the bottom of page 4, second sentence in the third paragraph reads carbohydrates and protein both are known to enter into fat formation under some conditions. I object to this wording.

Mr. Russell: It could be corrected by saying carbohydrates are known to enter into fat formation under most conditions and proteins to some extent.

Dr. Moulton: I object "to some conditions."

You could change the fat formation and say the latter under certain conditions.

Mr. Russell: To my mind there are two or three questions up. If we are going to appoint a committee to go over this report and report tomorrow morning any corrections can be made now and the committee could consider them.

Mr. Hostetler: I make a motion that a committee composed of Dr. Moulton, Mr. Salmon, Dr. Howe and Dr. Jacob be appointed to go over the bulletin and make such corrections in the manuscript as they think necessary and report back to this meeting tomorrow morning.

Motion made and seconded that this committee go over the bulletin and make the corrections. Carried.

Mr. Russell: May I suggest that each individual who has a suggestion either give it to the committee or bring it back here tomorrow.

Somebody asked me how are you going to get the material in Department Bulletin 1407 to the farmer. There is some advantage to a Department bulletin. The suggestion is that you gentlemen when you get back home and get time to look this matter over, take out certain features which are applicable to your locality and particular line of work. You can get it into your county press, agricultural press, etc. I think there are a lot of conclusions and other information in this bulletin that many of our farmers would be interested in.

Is there anything further?

Mr. Vestal: I have a question I would like to raise. What is the possibility of taking these hog carcasses for further meat study especially related to loss in cure, and cooking as related to palatability.

Mr. Russell: There is one study we attempted to make and I think it is a mighty important one but we just can not do it. That is the shrinkage of meat from soft carcasses as compared to hard carcasses in the cured meat under the same conditions.

Mr. Vestal: The question has been raised as to whether we have used the right standard in judging soft pork. We are losing a great opportunity if we do not utilize these carcasses for further study.

Mr. Russell: Have you some particular suggestion as to how to do it.

Mr. Vestal: No, I have not.

Mr. Russell: I presume that you are figuring on getting the Home Economics people into it.

Mr. Hankins: I can say a word along this line which may be of some interest. I am informed that there is a possibility the Animal Husbandry Division will have, beginning July 1, a woman jointly employed with the Bureau of Home Economics in Washington and who will devote her entire time to products which our Division will furnish. I say this is a possibility. In case that arrangement is made of course her work will be primarily in connection with the beef project, but not entirely. I was discussing this matter with Mr. Sheets the other day and, in fact, we talked about this very question probably coming up at this conference. I asked him what I could say to you if it did come up. He said I could tell you this, that in case this woman is available for our work there is no reason why she could not spend some time on pork products as well as beef. Looking into the future, possibly we could figure on even additional help along that line provided our work with pork develops sufficiently to warrant it. It seems to us who have discussed this thing considerably that it is the logical end to which our work along the soft pork line should be carried. We are stopping short of the goal unless we do study the products down to the dining table. We hope that we will be able to help out along that line.

Mr. Russell: In that connection it would be necessary to have it understood that it would be necessary for us to retain one or more of the carcasses from some of the shipments from the State stations for this purpose. There would be no trouble in getting carcasses from any of the hogs that belong to the Department.

If arrangements are made as Mr. Hankins said it would not be very expensive to the stations. If we had the money we would be glad to buy the carcasses and send the money to you but we do not have it.

Mr. Salmon: I just wonder if the cooperating stations could not make an arrangement to have their Home Economics people run some tests. I should think they would be able to do it.

Dr. Jacob: Is not it understood that this Furnell money is to be devoted to work with the Home Economics Department? If such is the case it might well be appropriated for soft-pork work.

Mr. Russell: If we get someone in our division from the Home Economics Bureau to do this work and some of the State Home Economics people take up some of the investigations it rather occurs to me that some definite plan should be worked out. There is no reason why the State Home Economics people can not take this up.

Mr. Vestal, do you want your committee to take some action in this matter?

Mr. Vestal: I would like to get the consensus of opinion of this group on that subject.

Mr. Russell: It just occurred to me that possibly a resolution through this group recommending that the State Home Economics people take up some studies along this line would be a good one.

Dr. Moulton: Does that refer to cured products from bacons and hams?

Dr. Howe: There was a letter came into the office the other day from a Fat and Oil concern asking for a review of what has been done in soft pork. Mr. Ellis raised the question ^{whether} or not that could be done without the approval of this meeting. I assume it would only cover what is in the bulletin.

Mr. Russell: We would not need any action from this meeting. Anything else as far as results are concerned could not be given out without the approval of this meeting.

Mr. Russell: We will now adjourn until tomorrow morning at 9:30.

Thursday Morning

Mr. Russell: We will now come to order. Just before adjourning last evening we appointed a committee to go over the manuscript of the proposed bulletin and I think we had better take that up first. Dr. Moulton is chairman of the committee and we would be glad to hear from him.

Dr. Moulton:

The committee has most of its suggestions in connection with the first half dozen pages of the bulletin. You will recall that we spent some considerable time on the first paragraph. The committee had no further recommendations concerning that paragraph. It stands as follows:

"The products of soft hogs have certain undesirable characteristics. There is a lack of firmness in the fat which may be so extreme as to cause a typical soft, flaccid, shapeless condition in the products, which makes them inconvenient to handle and unattractive to many people. The hams are probably least and the lard most subject to criticism, depending upon the proportion of fat in the product."

Mr. Russell: If there is no objection we will hear the Doctor's report entirely. We will then take action either by sections or as a whole.

Dr. Moulton: In the third paragraph of the same page the third sentence speaks of the size of the price differential which has been established at about 2¢. The question raised last night as to whether that was the case with the packers at present. I think that many of the packers have ceased to cut this 2¢. I think they buy what they get.

On page 2, fifth line from the top, at the beginning of the line we have the sentence "The retail dealer prefers to handle products from firm hogs. The next sentence reads "They hold their shape better, etc. I think the next sentence should be changed to read, "These products hold their shape, etc." Also cut out the last sentence beginning with the housewife.

The next paragraph has one change that of Institute instead of Institution of Meat Packers.

The first paragraph on page 3 refers to the work of the grading committee. The rest of the paragraph refers to other things. We think it is

well to add this sentence "This committee grades for firmness, the carcasses of practically all hogs used in connection with these studies" to the preceding paragraph and make a new paragraph with the sentence "The hogs are fed at the various institutions cooperating in the work according to experiment plans agreed to by the group of cooperators, and are shipped to the U. S. Experiment Farm at Beltsville, Maryland, for slaughter, committee grading and laboratory studies of the fats."

We have some editorial suggestions here and which apply to other parts of the manuscript where the word experiment plans has been used. We suggest instead of experiment plans, the plans of the experiments as agreed to by, etc. With your consent I will not mention any editorial corrections.

On page 4, second paragraph that begins with the words "It is well known that the fact." We have some suggestions concerning that paragraph. We suggest that the last sentence be made the first sentence as follows: "The quality and quantity of the fat in the various common feeds exert a wide range of influence on the firmness of body fat." In the second sentence we suggest that you cut out the word "that" and insert "when" right after it. "It is well known when the fat of feeds is stored etc."

The last paragraph on page 4 brought about a discussion last night. Before bringing to your attention the suggestions I think we should explain it a little. This paragraph is written from the point of view of the animal feeder in the district where oily feeds are fed. From that point of view it represents the normal conditions. Our suggestion is that we cut out sentences 2, 3 and 5 of that paragraph. We retain the first sentence. In the place of the third sentence taken out add the following material. "The animal body uses carbohydrates first to apply its need for energy. Any surplus above this need goes to build up a reserve of fat. Under the usual conditions of animal feeding in this country this is the chief source of synthesized animal fat. Protein may also be used to form body fat under certain conditions, for example when fed in large excess of the body's need. Under usual agricultural practices this seldom happens. When feeds containing large amounts of fat, however, are fed in the ration the quantity and quality of the fat fed has a marked influence upon the body fat deposited."

Dr. Halverson: Down here we are dealing with high protein feeds which are fed very extensively. It is a big sectional problem. One of the big exceptions applies to a large area here.

Dr. Moulton: The next change is a slight one which does not change facts at all but for smoothness in the middle paragraph on page 6 where it speaks about the early work having been done with peanuts. Peanut feeding is the thing on which we started these investigations. The fifth line of that paragraph states the work along this line has been conducted. We suggest while work along this line has been conducted it was soon found to be necessary to investigate different feeds and factors other than feeds. The next sentence

will read "Among these other feeds which called for study on account of their probable softening influence were rice polish, rice bran, mast and soybeans." We will pull the next to the last line up and say "Among the other factors were etc." Leave out "among the other factors which early showed their possible importance." Our suggestion is that the next to the last sentence read as follows: "The other factors which early showed their possible influence were initial weight, finish, sex, thrift, previous treatment, and breed."

The only other suggestions are so trivial that we will not bring them up here. Just one I think should be brought up here. That is where you use 2 and 2 1/2 per cent corn. Explain what 2 1/2 per cent of corn is. If you use it in the title as you do on page 29, I would suggest that the first time you use it you use it for a title and put a foot note explaining it.

Mr. Hankins: This 2 and 2 1/2 per cent corn is explained on page 29 about two-thirds of the way down the page. "The pigs in all lots were weighed periodically and using these weights as bases the amount of shelled corn to be fed per day was calculated."

I do think this should be explained in a foot note.

Mr. Russell: The first suggested change the committee reported is on page 1, first paragraph. You will recall that we adopted a change last night but I think it is subject to revision. I will put it this way. Is there any objection or correction to the change which has just been recommended by the committee? If not it will stand approved as the committee suggests. The change in paragraph one has been approved. Although the conference recommends these changes we are not going to guarantee that they will go through.

The next change is at the bottom of the page regarding price differential. I just want to say that this matter came up in our office and it was discussed and we thought for the information of the public too, we should get facts as much as we could. Our first thought was to name certain markets and show the price differentials but we gave that up. We wrote to the livestock commission men at these various markets, to the stock yards companies and to the packers who were buying hogs at these various markets where soft hogs generally come and also had the packers and stockyards administration men take this matter up. The replies were so indefinite and evasive that we could not use them by markets. In addition to that some personal inquiries were made. We thought that the general price differential should be inserted. Oklahoma City up and until the first of January last year did take off 3¢ but they dropped to 2¢. Taking them altogether the best estimate we could make was this one of 2¢ and we thought it was advisable to put it into the bulletin for the information of the public to show possible losses by raising soft hogs. That is the reason of the 2¢.

Dr. Moulton: Is it the present practice?

Mr. Russell: While this inquiry took place two years ago our office keeps in touch with these changes as nearly as we can. We will take Moultrie, Georgia where probably the most soft hogs come in. The Moultrie market is based on

a soft hog price. They pay a premium for hard hogs. The best information we have is that 2¢ is about right.

Are there any suggestions? That will stand as there are no suggestions.

The next correction is on page 2, the latter part of the top paragraph, the last sentence. The motion was made to eliminate the last sentence.

Are there any changes? If not, it will stand as recommended by the committee.

The next change is the second or last paragraph on page 2, eliminating the first sentence of page 3 and having the last paragraph on page 2 continued with the wording "This committee grades for firmness, the carcasses of practically all hogs used in connection with these studies."

Are there any suggestions? If there are no suggestions it will stand as it is. The suggestion of the committee stands as recommended. There is no change on page 3 except that the first sentence is eliminated.

On page 4 the beginning of the second paragraph, leave the word "well" out. "It is known when the fat of feeds etc."

Mr. Hankins: I would suggest the use of "no essential change" instead of "not an essential change." The former is smoother.

Mr. Russell: Is that accepted? The changes suggested by the committee as corrected by Mr. Hankins suggestion will stand.

In the sentence beginning "On the other hand, with feeds containing a low percentage of soft or oily fat, the body fat produced shows little similarity it being in the usual case, etc. Take out "it being" and start a new sentence with "In the latter case the body fat, etc."

If we hear no objections or corrections the recommendation of the committee is adopted.

In the last paragraph on page 4 it is thought that sentences 2, 3 and 5 should be eliminated and in place of them insert the following:

"The animal body uses carbohydrates first to supply its need for energy. Any surplus above this need goes to build up a reserve of fat. Under the usual conditions of animal feeding in this country this is the chief source of synthesized animal fat. Protein may also be used to form body fat under certain conditions, for example when fed in large excess of the body's need. Under usual agricultural practices this seldom happens. When feeds containing large amounts of fat, however, are fed in the ration the quantity and quality of the fat fed has a marked influence upon the body fat deposited."

Dr. Howe: Dr. Moulton has raised a question there when he talks about normal body fat. It is really a very important and fundamental statement.

Mr. Hankins: I would like to comment on this. It seems to me that the average reader will interpret that to mean the fat formed under normal conditions.

We can place various interpretations on "normal conditions." What is normal in one place may not be normal in another place. I think if you would ask the average reader of bulletins such as this will be what hog has normal fat the person would say in the United States the corn-fed hog. That is not definite because corn-fed hogs vary in fineness. I think we are on shaky ground to talk about normal fat of a hog. Under primitive conditions the hog would probably be soft and oily. Personally I would rather not bring in any reference to normal fat of a hog, because I think it brings up a point of argument. If it is used I think we would have to explain what is meant by normal. I question the value of any reference to normal fat.

Mr. Edwards: How would it be to say normally hard or normally firm?

Mr. Halverson: In the early days when they had a lot of acorns they were bothered with soft hogs.

Mr. Russell: You have heard the discussion so far. Is there any suggestion in this matter?

Mr. Hankins: I think that all reference to "normal" fat should be left out and make a motion to that effect.

Motion made and seconded that the sentence referring to normal fat be left out entirely. Carried.

Mr. Russell: That disposes of the material on page 5, the first paragraph down to the last sentence commencing "Common feeds and feed combinations containing high percentages of carbohydrates and low percentages of fat etc."

Is that correct Dr. Moulton?

Dr. Moulton: Yes, it is. The only other changes are simply grammatical.

The next suggestion of the committee is in the second paragraph on page 6, the third sentence, which now begins with the words, "Work along these lines has been continued, etc." We suggest that you add "While the work along these lines etc." and add the words "it was soon found to be necessary to investigate different feeds and factors other than feed."

Mr. Russell: Are there any corrections or suggestions to the report of the committee? If not it will stand approved.

The next correction is in the next to the last sentence. Say "Other factors which early showed their possible influence were initial weight, finish, sex, thrift, previous treatment and breed."

Are there any objections or corrections? If not, it will stand approved as reported.

The next corrections are on pages 22 and 29. That is the explanation of the 2 1/2 per cent.

Dr. Howe: The committee approved the refractive index table by Mr. Ellis and recommended it put in this bulletin.

Mr. Ellis: Where would you put it?

Dr. Moulton: I would rather think after page 6. You are going to assume the rest of the way through that your reader understands the use of it.

Mr. Russell: If there are no recommendations or changes it is approved.

The question is now will the report of the committee be accepted as submitted. If there is no objection to the report of the committee it will stand approved by this conference.

The next will be a report of the committee on conclusions to be released for publication and also the work for the coming year.

We will now hear from Mr. Vestal as Chairman of this committee.

Mr. Vestal: The committee after the usual and some unusual deliberation decided to recommend the following conclusions:

(1) Soybeans grazed with a supplementary ration of 1.5 to 2.5 per cent of shelled corn and with minerals self-fed, to pigs starting at weights ranging from 25 to 85 pounds and making gains of approximately 40 to 75 pounds through a period of from 8 to 10 weeks produce, in the usual case, carcasses of a satisfactory degree of firmness when a subsequent gain in weight of 125 pounds or more has been made by the pigs on corn with tankege.

(2) Soybeans fed as a supplement to corn in dry lot in the ratio of one pound of soybeans to three pounds of shelled corn to pigs ranging up to 130 pounds in starting weights will not produce firm carcasses in the usual case when the hogs are slaughtered after a gain of approximately 100 pounds or more has been made on the corn-soybean ration.

Mr. Vestal: The committee recommends that this be released through the public press. It also recommends that this be included in the bulletin manuscript now in preparation.

Mr. Russell: Gentlemen, do you question the first conclusion? If you notice in one case the conclusion is that satisfactory hogs will be produced where two or three times as much gain on corn and tankege as on soybeans while in the second case where the starting weights were heavier it required only twice as much gain on corn as soybeans to produce satisfactory carcasses.

Are there any corrections, suggestions or alterations to these conclusions?

Mr. Durant: I think most of that work was done at our station and I think it is very satisfactory.

Mr. Russell: If I hear no objection the report of the committee will be adopted.

Mr. Hankins: I would like to make a comment in that connection. You have heard the report of the committee. Mr. Ellis just asked me again what I thought of the plan of withholding the report until such time as we are

able to report on these other proportions so that the whole could be published together. I believe the thought of the committee was that if we held this information it would be possibly two years before we could get it published. Of course we could publish it as a press notice. That should be considered in your voting on this question.

Mr. Russell: Are there any further suggestions?

Mr. Salmon: I would like to ask if it might be possible to modify the statement so it could be worded to give the idea that further work along that line would be taken up.

Mr. Vestal: I move that these conclusions be incorporated in the bulletin.

Mr. Russell: If there is no objection these conclusions will be incorporated in the forthcoming bulletin.

No objections, it stands approved.

Mr. Vestal: I now have the proposed work for the coming year.

The recommendations of the committee for experiments during the coming year are as follows:

Soybean Feeding Work

1. (125 pound pigs to be used)

Corn and soybeans (grown together) hogged-down 8 weeks. Different varieties of soybeans to be grown and hogged-down with corn in separate lots. Mineral mixture to be self-fed in all lots.

(All hogs to be slaughtered at the close of the experimental feeding period)

Assignments

Alabama Agricultural Experiment Station
Ohio Agricultural Experiment Station

2. (125 pound pigs to be used)

Corn and soybeans (grown together) hogged-down 8 weeks. Four different varieties of soybeans (yellow, green, brown and black in color) to be grown and hogged-down in one field. Mineral mixture to be self-fed.

(All hogs to be slaughtered at the close of the experimental feeding period)

Assignments

Pennsylvania Agricultural Experiment Station
Virginia " " "
U. S. Experiment Farm, Beltsville, Md.

3. (125 pound pigs to be used)

Corn and soybeans (grown together) hogged-down approximately 8 weeks. Comparison of 2 varieties of soybeans (early vs. late maturing), when hogged-down concurrently in separate lots. Mineral mixture to be self-fed.

(All hogs to be slaughtered at the close of the experimental feeding period)

Assignment

Ohio Experiment Station

4. (125 pound pigs to be used)

Corn and soybeans (grown together) hogged-down 8 weeks. A succession of varieties of soybeans to be used. Mineral mixture to be self-fed.

(All hogs to be slaughtered at the close of the experimental feeding period).

Assignments

Mississippi Agricultural Experiment Station
South Carolina " " "
Coastal Plain " "

5. (125 pound pigs to be used)

Corn and soybeans (grown together) hogged-down with and without mineral supplements self-fed 8 weeks.

(All hogs to be slaughtered at the close of the experimental feeding period)

Assignments

Purdue University Agricultural Experiment Station
Iberia Livestock Experiment Farm
U. S. Experiment Farm, Beltsville, Md.

6.

It is recommended that, as supplementary to the hogging-down experiments outlined above, in all possible cases the same varieties of soybeans be self-fed with corn in dry lot or lots to comparable pigs. The method of offering the varieties of beans should be similar to that employed in the field work, that is, free choice in one lot or separately in different lots. It is understood that the number of pigs to be used in these supplementary lots would be comparatively small.

7.

Definite proportions of soybeans and corn for fattening 100 pound pigs in dry lot.

Work is in progress at the Purdue University Experiment Station and at the U. S. Experiment Farm, Beltsville, Md., in which 100 pound pigs are

being fed 12, 9, 6 and 3 parts of ground corn with 1 part of ground soybeans (with mineral mixture supplement) to produce an average gain of approximately 125 pounds per pig. It is proposed to continue that line of work. Definite plans for future work depend upon the results of experiments soon to be completed.

Assignments

Purdue University Agricultural Experiment Station
Virginia " " "
U. S. Experiment Farm, Beltsville, Md.

8. (70 pound pigs to be used)

Corn and ground soybeans self-fed, free choice, with and without mineral mixture supplement on legume pasture to produce an average gain per pig of approximately 150 pounds.

(All hogs to be slaughtered at the close of the experiment feeding period)

Assignment

Purdue University Agricultural Experiment Station

9. (40 pound pigs to be used)

Comparison of ground and cooked soybeans when fed as supplements to corn to produce hogs of market weight. Mineral mixture to be self-fed.

(All hogs to be slaughtered at the close of the experimental feeding period)

Assignment

Ohio Agricultural Experiment Station

10. (40 pound pigs to be used)

Comparison of soybean oil meals (prepared by different processes) when fed as supplements to corn to produce hogs of market weight from pigs starting at approximately 40 pounds weight. Mineral mixture to be self-fed.

(All hogs to be slaughtered at the close of the experimental feeding period)

Assignment

Ohio Agricultural Experiment Station

11. (125 pound pigs to be used)

Comparison of different varieties of harvested soybeans when self-fed with corn in dry lot or lots for approximately 8 weeks or to produce hogs of market weight. Mineral mixture also to be self-fed.

(All hogs to be slaughtered at the close of the experimental feeding period)

Assignments

Ohio Agricultural Experiment Station

Virginia " " "

U. S. Experiment Farm, Beltsville, Md.

(See also recommendations under section 6 above)

12. (40 pound pigs to be used)

Comparison of different varieties of harvested soybeans when self-fed as supplementary to corn in separate dry lots to produce hogs of market weight. Mineral mixture to be self-fed.

(All hogs to be slaughtered at the close of the experimental feeding period)

Assignments

Ohio Agricultural Experiment Station

Peanut Feeding Work

1. (30 to 50 pound pigs to be used)

Peanuts alone (or with supplements) grazed or self-fed approximately 8 weeks followed by corn self-fed with tankage (or fishmeal) and corn with cottonseed meal (6:1) for approximately 16 weeks. Mineral mixture to be self-fed.

(Killings to be made after 8, 12 and 16 weeks on the hardening feeds)

Assignments

Hardening Ration

North Carolina Agricultural Experiment Station Corn with cottonseed meal (6:1)

Virginia " " " Corn with tankage

U. S. Experiment Farm, Beltsville, Md. Corn with tankage

In the North Carolina Station work six other pigs will be fed individually. They will be fed on the peanut ration to a weight of approximately 100 pounds and then three pigs hardened on each of the two rations given above. Slaughtering will be done after the hogs have consumed approximately 2 1/2 times as much carbohydrates in the hardening rations as oil or fat previously consumed in the peanuts.

2. (50 to 85 pound pigs to be used)

Peanuts alone (or with supplements) grazed or self-fed approximately 8 weeks followed by corn self-fed with tankage (or fishmeal) and corn with cottonseed meal (6:1) for approximately 16 weeks. Mineral mixture to be self-fed.

(Killings to be made after 8, 12 and 16 weeks on the hardening feeds)

Assignments

| | |
|------------------------------------------------|-------------------------------|
| North Carolina Agricultural Experiment Station | Hardening Ration |
| Virginia | Corn with cottonseed meal 6:1 |
| U. S. Experiment Farm, Beltsville, Md. | Corn with tankage |
| | Corn with tankage |

In the North Carolina work six other pigs will be fed individually. They will be fed on the peanut ration to a weight of 125 to 130 pounds and the three pigs hardened on each of the two rations given above. Slaughtering will be done after the hogs have consumed approximately 2 1/2 times as much carbohydrates in the hardening rations as oil or fat previously consumed in the peanuts.

Rice Py-Products Feeding Work

1. (30 to 50 pound Fall pigs to be used)

Rice polish and tankage self-fed in dry lot or on oat or rye pasture 8 weeks followed by shelled corn and tankage and brewers' rice and tankage self-fed in dry lot or on oat or rye pasture 8 to 12 weeks.

(All hogs to be killed at the close of the experimental feeding period)

Assignments

| | |
|------------------------------------------|-------------------|
| Arkansas Agricultural Experiment Station | Hardening Ration |
| Iberia Livestock Experiment Farm | Corn and tankage |
| | " " " |
| Arkansas Agricultural Experiment Station | Brewers' rice and |
| Iberia Livestock Experiment Farm | tankage |
| | " " " " |

2. (30 to 50 pound Fall pigs to be used)

Rice bran and tankage self-fed in dry lot or on oat or rye pasture 8 weeks followed by shelled corn and tankage and brewers' rice and tankage, self-fed in dry lot or on oat or rye pasture 8 to 12 weeks.

(All hogs to be killed at the close of the experimental feeding period)

Assignments

| | |
|------------------------------------------|-------------------------|
| Arkansas Agricultural Experiment Station | Hardening Ration |
| Iberia Livestock Experiment Farm | Corn and tankage |
| | " " " |
| Arkansas Agricultural Experiment Station | Brewers' rice & tankage |
| Iberia Livestock Experiment Farm | " " " |

Velvet Bean Feeding Work

1. (100 pound pigs to be used)

Comparison of dry and soaked velvet beans, soaked beans with mineral supplement, soaked beans with vitamin supplement, and soaked beans with both

mineral and vitamin supplements, when fed to 100 pound pigs to produce hogs of market weight.

(All hogs to be killed at the close of the experimental feeding period)

Assignment

Georgia Agricultural Experiment Station

Developing and Feeding Broad Sows on Softening and Unusually Hardening Feeds.

1. (Beginning with weanling sow pigs and mature sows at time of breeding.)

A study of the influence of softening (including peanuts and rice by-products) and unusually hardening (brewers' rice) feeds used in the growing of sows and during the gestation period upon the firmness of their pigs at market weight when the pigs are grown to such weight on nonsoftening feeds.

(All pigs to be killed at approximately 200 pounds weight)

Assignments

Arkansas Agricultural Experiment Station U. S. Experiment Farm, Beltsville, Md.

Alfalfa Feeding Work

1. (Beginning with weanling sow pigs and mature sows at time of breeding)

A study of the influence of alfalfa pasture used in the growing of sows during the gestation period and during the growing and fattening of their pigs upon the firmness of the pigs at market weight when the grain ration fed to the pigs is composed of nonsoftening feeds.

(All pigs to be killed at approximately 200 pounds weight)

Assignment

California Agricultural Experiment Station

It was agreed that in connection with each experiment, or whenever possible a check lot should be fed on corn and tankage, using as many pigs as available. All pigs fed in the check lot should be killed at the close of the experiment or killings of representatives made at such times during the experiment as seem necessary.

To avoid the use of unthrifty pigs it is recommended that a standard of at least 100 pounds weight for pigs of 6 to 7 months of age be followed. Where pigs of other initial weights are used the ages should vary accordingly.

In accordance with the plan which has been followed for several years it is understood that 3 representative pigs will be slaughtered at the beginning of each experiment as "checks". Further a sufficient number of pigs is to be used in each lot to provide for a minimum of 3 in each killing during the course of the experiment.

The committee recommends that the Washington office designate the mineral mixture to be used in all experiments along each line.

Mr. Salmon: Is it necessary that the dry lot feeding be done at the same time as the hogging-down?

Mr. Robison: If you have two or three separate fields to hog down would that mean two or three extra lots in dry lot?

Mr. Vestal: We have noticed that we have had more hard hogs from the corn field with a certain variety of soybeans than during dry lot feeding.

Mr. Hankins: May I suggest that in discussing the supplementary dry lot work the idea was that a smaller number of hogs could be used in these lots and that they would be considered as supplementary to the field work.

Mr. Vestal: You would probably have a larger number in the corn field than in dry lot.

Mr. Nobles: What varieties would you use?

Mr. Vestal: That would have to be decided by the Bureau of Animal Industry and the station doing the work. It seems to me there would be a good many different varieties used. If you have certain varieties adapted to a certain area they should be used.

Mr. Russell: I think the agronomy people should be consulted for a variety that is best suited. If we could get three or four stations doing this work and have the color all the same we would be getting some place.

Mr. Vestal: The committee realizes they are covering a lot of territory in this proposed outline for hogging-down work, but we are right at a point where we need to get some new information on this hogging-down work. It probably is true that we are looking for a lead in outlining this work.

Are there any questions regarding the hogging-down outline?

The next line of investigations we have listed is the definite proportions of soybeans and corn for fattening hogs in dry lot. This has to do with the feeding of beans and corn as outlined on the board.

Mr. Russell: This matter has been gone over pretty clearly but I am going to put the usual question and if I hear no objection to the report of the

committee it will stand as reported by the chairman and approved by this conference.

I hear no objection so the report of the committee is approved.

That completes the regular work of the whole conference except one thing ~~and~~ that is generally quickly disposed of. Those of you who have been at these meetings understand it but for the benefit of our new men I will explain. It has been the practice to elect a member of the grading committee to act in making the official grades and as you know the grading committee is composed of three men, one who represents the various cooperating Experiment Stations, another the Institute of American Meat Packers and the third a member of the Bureau of Animal Industry. The Meat Packers have had Mr. Smith of Baltimore all the time. Except the first year the Bureau has had Dr. Walter of Washington and the cooperating stations have been represented by Mr. Hostetler. You understand that Mr. Hostetler's expenses have been borne by the cooperating stations pro rata. It has amounted to something like \$40.00 for each station per year. We are now ready for names for your representative for next year on this committee.

Motion made and seconded that Mr. Hostetler serve on the grading committee this coming year.

Mr. Hostetler is elected to serve on this committee.

Last year the committee recommended certain mineral mixtures to be used at the stations.

Mr. Vestal: The committee thought that it was very desirable and should be done again this year along with a check lot of corn and tankage whenever possible.

Mr. Russell: One matter I want to bring to the attention of the conference at this time is the possibility of our grading committee visiting various packing plants where soft hogs are killed in considerable numbers and grade the hogs in these coolers with the provision men at the plants to see what difference, if any, there is in the opinion of our grading committee and the packers at these points. I do not know whether we could put over our part of it but the idea would be to have the men visit such plants as Richmond, Baltimore, Ft. Worth and other places and go over the hogs in the cooler and grade them as they grade the experimental hogs. We have never checked the gradings of the committee with the opinion of the meat men in the different houses. It has been thought that it might be desirable to do this. We do not know just how these meat men at the various packing plants regard these grades.

I was in a packing house in the south last year and went over the hogs in the cooler with their provision man. I came out with the grading of a whole lot of soft hogs and he said that while he thought I was correct, at their plant they would accept them as commercially hard. If such a thing is undertaken, Mr. Hostetler being on that committee would have to have his expenses paid by the various cooperating experiment stations. We would like to ~~have~~ the conference take some action on this question.

Mr. Durant: I think that would be a good idea.

Mr. Salmon: What is the idea of it? We can not change our standards now.

Mr. Russell: No. We just wondered if there was any considerable difference between our grading of the hogs and those of the various packing plants.

I had three year's experience in grading hogs at Oklahoma City. I had three different men in Wilson & Company's plant to go with me in grading. We did not agree at all part of the time. I will say I was grading the hogs a little bit softer than they were most of the time.

Mr. Vestal: Mr. Russell there is usually a refund on our pro rata amount of Mr. Hostetler's expenses.

Mr. Hankins: I think nearly every year there has been a little excess. If there is anything left over it is refunded at the end of the year.

Mr. Vestal: Since that amount has been remitted to take care of the grading committee can not that include the expenses of this proposed trip as a part of the expenses of our representative on the grading committee or could that be done.

Mr. Hankins: The money belongs to the stations.

Dr. Halverson: It seems to me that this work is so important that it should be done.

Mr. Russell: We thought it of considerable importance.

Dr. Halverson: If our grades are higher than trade practices we should know it.

Mr. Hostetler: I would just like to make this explanation. There was some money left over from last year that should have been refunded to the various stations but it was not done because of the fact that this matter had been suggested and it was thought best to retain the refund until this body could have the opportunity to take action upon the matter.

Mr. Russell: Are there any suggestions?

Mr. Templeton: I move that we instruct Mr. Hankins to pro rate this expense for the various cooperating stations for Mr. Hostetler to make this trip.

Motion made and seconded that this be done. Carried.

Mr. Russell: I just want to say this. Not all of Mr. Hostetler's trips to Washington are paid by the committee. When there is nothing but government hogs the Department pays Mr. Hostetler's expenses.

There is one other matter we talked about last year and accomplished nothing. That is the matter of going into commercial packing houses where we can grade hogs that were fed on corn and soybeans. The conference last

year talked this matter over to some extent and it was agreed that it would be very valuable supplemental data to our experimental results. If any of you gentlemen know of a carload of hogs that is going into the market, that is, hogs that have been hogging-down corn and soybeans and you will let us know the market to which they are consigned we will try to get somebody there. Mr. Hostetler reported a lot from North Carolina sent to Richmond and we sent Mr. Hankins and Dr. Walter to Richmond to grade them.

Mr. Vestal: In attempting to do that last year I took the matter up with the various county agents and asked them to help us line up prospects for this work. Half a dozen or so reported a number of good prospects. We had little success but finally located one carload of hogs. It was not very satisfactory. If we attempt anything of that sort this year we want to select a few farmers and get in personal touch with them at the beginning and follow these hogs right through, have an understanding with them as to where they are to ship the hogs when finished on corn and soybeans. We will have a better check on the feeding of the hogs and we will have more valuable results.

Mr. Russell: This is only tentative and I think it is going to be difficult to get them but if we could only get the results on three or four carloads of hogs to supplement our experimental results it would help a great deal.

Mr. Templeton: Mr. Vestal brought up a question yesterday of the advisability of making some further study of the carcasses possible in line with quality of meat work. The committee talked this matter over last night and have this resolution to offer.

Whereas the cooperative soft pork investigations have been conducted up to the present without consideration of the relative value to the consumer of the products from firm and soft hogs, and with a realization of the importance of such information to the consumer as well as to other concerned, be it resolved, therefore, that the Soft-Pork Conference urge the Federal Authorities and Directors of the State experiment stations to call this important matter to the attention of their workers and to provide funds and facilities for the prosecution of this phase of the investigation.

Mr. Russell: Gentlemen you have heard the resolution of the committee, Are there any objections?

Motion made and seconded that the resolution of the committee be adopted. Carried.

Mr. Hostetler: I have the following resolutions to offer:

That the members of this conference urge that the manuscript for the second soft-pork bulletin be issued as a Department Bulletin in form the same as Bulletin 1407, because of the necessity of getting the information contained therein to the public. Further, it is recommended that the second bulletin be issued as soon as possible.

Motion made and seconded that the resolution be adopted. Carried.

Mr. Russell: Of course the data in this manuscript undoubtedly is not going to be changed.

Is there anything further?

Mr. Hostetler: I would like to issue an urgent invitation to the members of this conference to hold their next meeting at Raleigh if the members can see a justification for such a decision. I might say that we have a new hotel completed and we also have a new agricultural building that can adequately house the meeting and we would like to see the meeting in there next year if it can be so decided.

Mr. Russell: The locations of these meetings as you know are a rather serious matter.. We have tried to equalize the expense the best we could. There are some stations that are nearer Atlanta than Chattanooga and some the other way, so as you know both places have been selected.

Do you want to take any action on Mr. Hostetler's invitation?

Mr. Templeton: I wonder if it would not be wise to leave the selection of the place of the next meeting to the men in the Department in Washington. Personally I would like to go to North Carolina.

Mr. Russell: We will take it up before the meeting with the stations whose expenses are greatest.

Mr. Edwards: I was asked to find out if this meeting could not be a little earlier. Our Director wanted to know if it would be possible to have this correspond with the meetings of the Southern Agricultural Workers' Association or some other meeting of the kind.

Mr. Russell: I know Mr. Edwards that Director Stuckey refers to the item of expense. When the meetings were first planned, the question of time place and expense to all concerned was given due consideration. The main object of the meetings is to hear reports of the past years work, showing just what has been accomplished along every line, add the information to the results of previous years and then plan for the coming year's work at the various stations. Our crops can only be produced at certain seasons of the year, consequently experiments cannot be conducted until the pigs and feed are available. Holding the meetings at this date prohibits us from having the results of some of the experiments and if it were held at the time of the Southern Agricultural Workers meetings, very few of the experiments would be finished, which would practically nullify the main object of the meeting, namely, planning cooperatively for the coming year.

Another reason why, in our opinion, it could not be successfully held at that time, is that it would be practically impossible to get men to stay for a six days meeting. The Southern Agricultural Workers take 3 days and our meetings take 3 days. We would be glad to have the expression of the members of the conference on the subject.

Mr. Hostetler: The meeting of the Southern Agricultural Workers comes in the middle of the week and if we ran this meeting for three days it would bring us away over Sunday.

Mr. Durant: I think this should be a separate meeting.

Mr. Russell: It just seems to me that we should get the results of the past year just in so far as we can to determine the work for the next year. Has anyone anything to offer on the question?

I just want to say in closing the meeting that as we all know and you have seen in taking part that we will use the slang term "The cards are on the table with the faces up." It has been one of the best meetings we have ever had during the progress of the work. The results have been certainly satisfactory. The proceedings of this meeting are always regarded as confidential. As soon as we can after we get back home the mimeographed copies will be mailed to you and they are, of course, regarded as confidential.

If there is nothing further, we will now adjourn until next year.

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